




3 1761 10374555 0

Government
Publications



Digitized by the Internet Archive
in 2023 with funding from
University of Toronto

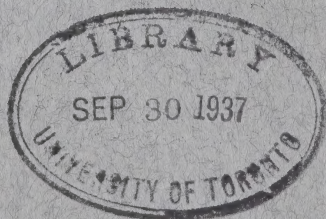
4-0-28
CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR

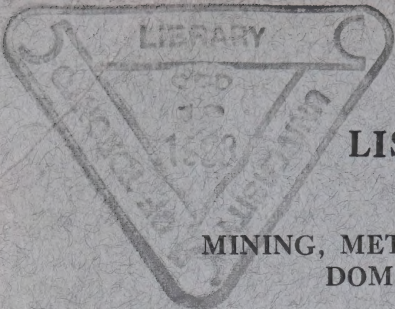
1933

Published by Authority of the Hon. R. B. Hanson, K.C., M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1935

Price, 50 cents



LIST OF PUBLICATIONS

PREPARED IN THE

MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

MINERAL PRODUCTION (Mining and Metallurgy).

General Reports—

Preliminary Reports (semi-annual) on the Mineral Production of Canada.

Monthly Reports on Canada's Leading Mineral Products.

Annual Report on the Mineral Production of Canada. (In one volume).

A comprehensive record of the mining industry embodying historical and world data, detailed information on mineral production, imports and exports for Canada and general statistics relative to the mining industry on capital investment, employment, fuel consumption and power equipment, arranged in 10 chapters, each dealing with a particular branch of the industry. Statistics on production and trade in mineral products appear in detail in the appropriate chapters. Fully indexed. Chapter titles are: Canada—The Gold Mining Industry—The Silver Mining Industry—The Nickel-Copper Industry—Miscellaneous Metal Mining Industries—The Non-Ferrous Smelting and Refining Industry—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries—Non-Metal Mining Industries (Other than Fuels)—The Clay Products and Other Structural Materials Industries—Notes on the Methods of Computing Values—Directory—Index.

Coal—

Monthly and Quarterly Reports on Coal and Coke Statistics for Canada.

A condensed report on production, imports and exports of coal and coke is issued monthly, publication being made about the twentieth of the next following month.

A more general review is published quarterly, showing statistics for each month, for the quarter, and for the year to date on the output by coal-mining districts and by provinces, imports and exports by ports and by kinds of coal, employment in coal mining, and tonnage lost. There is also a section on coke showing production, imports, exports, distribution and consumption by months and by provincial groups.

Annual Report on Coal Statistics for Canada.

Text and tables showing for Canada, and for each of the coal-producing provinces, historical and current data on output, tonnage lost, disposition of coal from the mines, domestic and foreign shipments, exports and imports by ports, consumption of coal, prices, employment, salaries and wages paid, power equipment, capital investment, etc.

ANNUAL BULLETINS—

Metals—The Gold Mining Industry in Canada which includes Alluvial Gold Mining, Auriferous Quartz Mining, Copper-Gold-Silver Mining, and tables showing Canadian and world production of Gold.—The Silver Mining Industry in Canada, which includes Silver-Cobalt-Arsenic Mining, Silver-Lead-Zinc Mining and tables showing Canadian and world production of Arsenic, Cobalt, Lead, Silver and Zinc.—The Nickel-Copper Mining, Smelting and Refining Industry, which includes Canadian and world production of Nickel.—The Canadian and World Production of Copper.—Metals of the Platinum Group.—The Production of Miscellaneous Metals, including Antimony, Beryl, Bismuth, Cadmium, Chromite, Lithium, Manganese, Mercury, Molybdenite, Radium, Selenium, Tin, Titanium, Tungsten.—The Non-Ferrous Smelting and Refining Industry.

Non-Metals.—Abrasives—Asbestos—Coal—Feldspar—Gypsum—Iron Oxides—Mica—Natural Gas—Petroleum—Quartz—Salt—Talc and Soapstone—Miscellaneous Non-Metallic Minerals, including Actinolite, Barytes, Bituminous Sands, Fluorspar, Graphite, Magnesitic Dolomite, Bog Manganese, Natural Mineral Waters, Phosphate, Silica Brick, Sodium Carbonate, Sodium Sulphate, Sulphur (Pyrites).

Structural Materials.—Cement—Clay and Clay Products—Lime—Sand and Gravel—Stone.

SEE INSIDE BACK COVER FOR PUBLICATIONS ON MANUFACTURES BASED CHIEFLY ON MINERALS

CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA
DURING THE CALENDAR YEAR

1933

Published by Authority of the Hon. R. B. Hanson, K.C., M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1935

NOTE ON STATISTICS OF PRODUCTION

In the collection of production data, the Dominion Bureau of Statistics makes a division between primary and secondary production. In the first-named class, there are separate sections for the collection of statistics on (a) **Agricultural Products**, (b) **Furs**, (c) **Fish**, (d) **Forest Products**, (e) **Mineral Products**.

In the second are included (a) **Manufacturing** and (b) **Construction**.

Manufacturing is subdivided into nine groups of industries, producing concerns being classified according to the principal component material of their major products. For example, manufactures of leather goods are classified under "Animal Products"; the pulp and paper industry under "Wood and Paper," etc. An outline of the scheme of classification in use for manufacturing industries is given below:

Manufactures of—

- (1) **Vegetable Products**, including—Coffee and Spices; Cocoa and Chocolate; Preserved and Canned Products; Pickles, Vinegar and Cider; Flour and Cereals; Bread and other Bakery Products; Macaroni and Vermicelli; Distilled and Brewed Liquors and Wines; Rubber Products; Starch and Glucose; Sugar, Tobacco Products; Linseed Oil and Oil Cake.
- (2) **Animal Products**, including—Fish and Fish Products; Dairy Factory Products; Meat and Meat Products; Leather and Leather Products; Furs and Fur Products.
- (3) **Textiles and Textile Products**, including—Cotton Textiles (Cloth, Yarn, Thread and Waste); Woollen Textiles (Cloth, Yarn, Blankets, Felt, and Waste); Silk Products; Factory-Made Clothing; Carpets, Rugs and Mats; Cordage, Rope and Twine.
- (4) **Wood and Paper**, including—Pulp and Paper Mill Products; Paper Goods; Printing, Publishing and Lithographing; Saw and Planing Mill Products; Furniture; Carriages; Wagons and Sleighs; Wooden Containers; Woodenware; Turned Wood Products; and the Output of Similar Wood-Using Industries.
- (5) **Iron and Steel and Their Products**, including—Pig Iron and Ferro-Alloys; Steel and Rolled Products; Castings and Forgings; Boilers, Tanks and Engines; Agricultural Implements; Machinery; Automobiles; Auto Parts and Accessories; Bicycles; Railway Rolling Stock; Wire and Wire Goods; Sheet Metal Products; Hardware, Tools and Cutlery; Bridge Building and Structural Steel Work; Miscellaneous Iron and Steel Products.
- (6) **Manufactures of Non-Ferrous Metal Products**, including—Aluminium Products; Brass and Copper Products; Lead, Tin and Zinc Products; Jewellery and Silverware; Electrical Apparatus and Supplies; Non-Ferrous Smelting and Refining; Miscellaneous Non-Ferrous Metal Products.
- (7) **Manufactures of the Non-Metallic Minerals**, including—Aerated Waters—Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Dressed Stone—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Miscellaneous Non-Metallic Mineral Products, n.e.s.
- (8) **Chemicals and Allied Products**, including—Coal Tar Distillation; Acids, Alkalies, and Salts—Compressed Gases; Explosives, Ammunition and Fireworks; Fertilizers; Medicinal and Pharmaceutical Preparations; Paints, Pigments and Varnishes; Soaps and Washing Compounds—Toilet Preparations; Inks; Adhesives; Polishes and Dressings; Wood Distillation; Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.
- (9) **Miscellaneous Products**, including—Brooms and Brushes; Electric Light and Power; Musical Instruments, etc.

The statistics of manufactures are also classified according to the **use or purpose** of the end product as follows:—

- (1) **Food**, including—Breadstuffs; Fish; Nuts; Fruits and Vegetables; Meats; Milk Products; Oils and Fats; Sugar; Infusions; Miscellaneous.
- (2) **Drink and Tobacco**, including—Beverages, alcoholic; Beverages, non-alcoholic; Tobacco.
- (3) **Clothing**, including—Boots and Shoes; Fur Goods; Garments and Personal Furnishings; Gloves and Mitts; Hats and Caps; Knitted Goods; Waterproofs; Miscellaneous.
- (4) **Personal Utilities**, including—Jewellery and Time-Pieces; Recreational Supplies; Personal Utilities, n.e.s.
- (5) **House Furnishings**.
- (6) **Books and Stationery**.
- (7) **Vehicles and Vessels**.
- (8) **Producers' Materials**, including—Farm Materials; Manufacturers' Materials; Building Materials General Materials.
- (9) **Industrial Equipment**, including—Farming Equipment; Manufacturing Equipment; Trading Equipment; Service Equipment; Light, Heat and Power Equipment; General Equipment.
- (10) **Miscellaneous**.

PREFACE

The Report on the Mineral Production of Canada has been issued annually by the Dominion Bureau of Statistics since 1921 and is in continuance of the annual series first published by the Geological Survey of Canada in 1886 and later by the Mines Branch of the Department of Mines. It contains final data on production, imports and exports of Canada's metals and minerals, figures on the capital invested in the mining industry, the number of employees, salaries and wages paid, the amount and kind of fuel used, electric power purchased or generated, and the power producing equipment installed.

Tables of world production of the more important minerals and metals are included for the purpose of assisting those who may be making international studies and who may not have a reference library readily accessible.

The chronological record of the principal mining events which have occurred in Canadian history, a feature of the last two reports, has been omitted from this report. This feature will be included again after a few years have elapsed.

Prior to 1931 it had always been the practice of the Bureau to evaluate gold at the standard price of \$20.671834 per fine ounce regardless of what might be defined as the normal fluctuations of foreign exchange. However, during the past three years, international events of great importance have resulted in a very pronounced increase in the price of gold. This price appears, at the present time, to have attained at least a temporary stability. For this reason the value of gold in this report, shown either separately or incorporated in the total value of Canadian mineral production, has been computed in Canadian funds. This new statistical procedure in the recording of gold values should be noted in making comparisons with corresponding data published in earlier reports.

In addition to this report the Bureau issues a preliminary report of mineral production about March 15th following the year to which it refers. Since the fuel problem is of major importance to Canada, a separate annual report and quarterly reports on coal statistics are published. Statistical bulletins on the production of Canada's principal minerals are issued monthly and bulletins on various branches of the mining industry are published as the information becomes available.

As in former years, the Bureau has continued to co-operate with the provinces of Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia in the collection of coal statistics.

By arrangement, the Bureau and the Mines Departments of the provinces of Quebec, Ontario, Manitoba and British Columbia use joint forms in the collection of mineral statistics. This system is of considerable advantage to the operator, as he now has to file only one form in duplicate and it also tends to greater comparability in Dominion and Provincial figures.

The cordial thanks of the Bureau are tendered to mine and smelter operators, to the Department of the Interior, to the Federal Department of Mines, to the Royal Canadian Mint and to the Imperial Institute, London, for assistance given and information made available. The railway and other transportation companies, as well as smelter operators outside of Canada, have also furnished data, the receipt of which is gratefully acknowledged.

This report has been prepared under the direction of Mr. W. H. Losee, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., and Mr. B. R. Hayden, of the mineral division staff.

R. H. COATS,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS,
OTTAWA, January 21, 1935.

TABLE OF CONTENTS

	PAGE
CHAPTER ONE—CANADA—General review.....	5
CHAPTER TWO—The Gold Mining Industry, including (a) The Alluvial Gold Mining Industry, (b) The Auriferous Quartz Mining Industry, and (c) The Copper-Gold-Silver Mining Industry and commodity statistics showing production, imports, exports and world output of <i>Gold</i>	36
CHAPTER THREE—The Silver Mining Industry, including (a) The Silver-Cobalt Mining Industry, (b) The Silver-Lead-Zinc Mining Industry, and commodity statistics showing production, imports, exports, prices and world output of <i>Arsenic, Cobalt Silver, Lead, and Zinc</i>	60
CHAPTER FOUR—The Nickel-Copper Mining, Smelting and Refining Industry, including commodity statistics showing production, imports, exports, prices and world production of <i>Nickel, Copper, and Metals of the Platinum Group</i>	86
CHAPTER FIVE—Miscellaneous Metal Mining Industries, including commodity statistics showing production, imports, exports, prices and world production of <i>Aluminium, Antimony, Bauxite, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron, Steel and Rolled Products, Manganese, Mercury, Molybdenum, Radium, Tin, Tungsten and Vanadium</i>	103
CHAPTER SIX—The Non-Ferrous Smelting and Refining Industry.....	131
CHAPTER SEVEN—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries (Fuels) including commodity statistics showing production, imports, exports, prices and world production of <i>Coal, Coke, Natural Gas, Peat and Crude Petroleum</i>	136
CHAPTER EIGHT—Non-Metal Mining Industries (excluding Fuels) including commodity statistics showing production, imports, exports, prices and world output of <i>Abrasives, Asbestos, Feldspar, Gypsum, Iron Oxides, Mica, Quartz, Salt, Talc and Soapstone</i> , and Miscellaneous Non-Metallic Minerals including: <i>Actinolite, Barytes, Bituminous Sands, Graphite, Fluorspar, Lithium Minerals, Magnesite, Magnesium Sulphate, Natural Mineral Waters, Natro-Alunite, Phosphate, Pyrites, Silica Brick, Sodium Carbonate and Sodium Sulphate</i>	159
CHAPTER NINE—The Clay Products and Other Structural Materials Industries, including commodity statistics showing production, imports and exports of <i>Cement, Clay and Clay Products</i> —(a) From Domestic Clays: <i>Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Sanitary Ware and Pottery, Fireclay, Firebrick, Fireclay Blocks and Shapes</i> ; (b) From Imported Clays: <i>Ceramic or Glazed Floor and Wall Tile, Electrical Porcelain Insulators, Sanitary Ware and Pottery, Fireclay Blocks and Shapes, Lime, Sand and Gravel, Sand-Lime Brick, Slate, and Stone</i>	207
APPENDIX—Explanatory notes on the method of computing values shown in reports on the mineral production of Canada.....	236
CHAPTER TEN—Directory—List showing the names, head offices and mine or plant addresses of all concerns operating in the mineral industry in Canada, arranged in alphabetical order by industries and by provinces.....	238
INDEX.....	267

DOMINION BUREAU OF STATISTICS

R. H. COATS, LL.D., F.R.S.C., F.S.S. (Hon.), Dominion Statistician

W. H. LOSEE, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch

ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1933

CHAPTER ONE

General Review.—A pronounced improvement was experienced in certain major branches of the Canadian mining industry in 1933, an improvement which coincided with a broad uptrend in trade, both domestic and international.

Since 1886, when comprehensive data were first collected for the Canadian mining industry as a whole, the advance has been truly remarkable. Valued at \$10,221,255 in 1886, or \$2.23 per capita, ten years later production had more than doubled. In another ten years the aggregate had grown three and one-half times. This total again more than doubled in 1916. A decade ago, in 1924, the total value had reached \$209,583,406; the world depression resulted in successive declines following the maximum value of \$310,850,246 in 1929 and it was particularly encouraging to attain, in the 1933 production of \$221,495,253, an increase of 21·3 per cent in value over that for the preceding year.

In the order of their production values the leading mineral products of Canada in 1933 were: gold, coal, copper, nickel, natural gas, zinc, lead, silver, asbestos, cement, sand and gravel, petroleum, stone, clay products, lime and salt. This list of sixteen products includes all that reach an output value of \$1,000,000 or over, together they make up about 98 per cent of the total recorded value of Canadian mineral production. In addition to these more important products, some 32 other minerals were produced in commercial quantities during the year. Canada's known mineral resources now comprise a wide variety of minerals, many deposits of these being of sufficient richness to be of world importance. Canada produces, normally, about 90 per cent of the world's nickel, 60 per cent of its asbestos, nearly 35 per cent of its cobalt, 12 per cent of its gold and lead, 10 per cent of its silver, 15 per cent of its zinc and 13 per cent of its copper. The Dominion is now also one of the world's larger producers of the platinum metals, aluminium and radium and uranium.

The value of metallic mineral production in 1933 represents a 31 per cent increase over 1932. Metals, as a group, still retain the premier position in Canadian mineral production, this is due largely to important increases in the output of gold, copper, lead, zinc and nickel. The figures of values for 1933 established new high records for gold and selenium and it is interesting to note that, in 1933, the first commercial production of primary radium and uranium products occurred when the elements were extracted from pitchblende-silver ores mined at Great Bear Lake, Northwest Territories.

Canadian producers of primary gold, especially those operating on low grade ores, have, in common with those of other countries, benefited greatly since 1931, from the pronounced increase in the price of the precious metal, an increase realized in an era of peculiar economic conditions, which were not only complex in nature but international in scope. This resulted in 1933, in an exceptionally wide and intensified search for and exploration and development of auriferous ores; prospecting activities not only increased in the older fields but were extended into areas heretofore considered by the miner as almost virgin in character. A falling-off in silver

output in 1933 was largely accounted for by the diminishing activities in the silver-cobalt mining districts of northern Ontario. Notwithstanding the important increases recorded in copper, lead and zinc production the most outstanding advance in base metal output in 1933 was that realized for nickel; statistics relating to nickel production in 1933 reveal an increase of 174.5 per cent in quantity and 180.4 per cent in value over the corresponding figures for the preceding year. This increase followed continuous annual declines in Canadian nickel production since 1929 and the pronounced recovery effected in the nickel mining industry is significant in that it is more or less synchronous with an almost general upward trend in world trade.

The value of production of non-metallics, other than structural materials, increased from \$93,239,852 in 1928 to \$97,861,356 in 1929, then declined to \$83,402,349 in 1930, then to \$65,346,284 in 1931 and \$56,788,179 in 1932; in 1933 these minerals showed an encouraging increase to \$57,782,973. The sub-group, fuels, of which coal is the principal constituent, realized a production valued at \$47,778,436 in 1933 or about 83 per cent of the non-metallic total. In 1928 the production of crude petroleum was 624,184 barrels valued at \$2,035,300; in 1933 it had risen to 1,145,333 barrels valued at \$3,138,791. This increase is due almost entirely to the greater production from Western Canada, especially the Turner Valley and other areas in the outer foothills. Coal production in 1933 totalled 11,903,344 short tons, a 1.4 per cent increase over the preceding year; Nova Scotia, New Brunswick, Manitoba, Saskatchewan and the Yukon produced more coal than in 1932, on the other hand, Alberta's output declined 3.1 per cent and British Columbia's 17.8 per cent. Continued assistance to the operators, in the form of a subvention paid by the Dominion government, was responsible, to a considerable extent, for the increased shipments of Canadian coal. In 1933 approximately 1,933,000 short tons of coal were moved under assisted freight rates.

The more outstanding increases in the 1933 production of the inorganic minerals of the non-metallic group were those recorded for asbestos and sodium sulphate. Asbestos shipments at 158,367 tons represented an increase of 28.8 per cent over the output for 1932, the value of the 1933 production totalled \$5,211,177 as against \$3,039,721 in 1932 or an increase of 71.4 per cent. Shipments of sodium sulphate from deposits in Saskatchewan were valued at \$485,416 compared with \$271,736, in 1932.

Clay products and other structural materials, including cement, stone, sand and gravel, and lime, increased from a value of \$49,737,181 in 1928 to \$58,534,834 in 1929; this has been followed by successive recessions to \$16,696,687 in 1933. Considerable declines were recorded in both the quantity and value of cement, sand and gravel, and stone sold during 1933 as compared with 1932. This decrease in structural material production is the direct result of the continued depression in the building trades. It is, however, extremely encouraging to note in the first half of 1934, a distinct improvement both in construction and in the production of clay products, cement, lime, stone and sand and gravel.

The major mineral producing provinces in 1933, in the order of the value of their outputs, were Ontario, British Columbia and Quebec, the first named producing 49.8 per cent of the total, British Columbia 13.9 per cent and Quebec 12.7 per cent. These three provinces constitute the Dominion's chief source of metal production although in recent years Manitoba has reached a position of prominence as a producer of copper, zinc, silver and gold.

Industrial data relating to the mining industry in Canada reveal that operating mines, smelters, refineries, oil and gas fields, clay products plants, cement mills, sand and gravel properties and stone quarries represented a total capital investment of \$800,292,347 in 1933. The survey conducted by the Bureau covered the operations of 10,873 mines, quarries, smelters, etc. Returns showed that the entire mining industry afforded employment to 63,334 persons, an increase of 3 per cent over the preceding year; employees in 1933 received in salaries and wages a total of \$70,031,805 compared with \$71,772,049 in 1932. Net sales of mineral products amounted to \$221,754,818. This value is 13 per cent in excess of 1932 and represents the proceeds from sales and includes the value added by smelting operations. This figure should not be confused with the value of Canadian mineral production for 1933 as shown in table 2, which figure, amounting to \$221,495,253 includes the value of the metals computed at average prices in a recognized world market, together with the reported value of sales of non-metals and structural materials.

Producers of primary base metals, and structural materials, have experienced, since 1930, exceptionally unfavourable conditions from an economic standpoint. Prices have generally been at abnormally low levels and activities in the construction and building industries almost at the point of stagnation and it is indeed gratifying to record in 1933 and more especially the early part of 1934 a distinct expansion and almost general improvement in the Canadian mining industry. This improvement was particularly emphasized in a comparison of the 1932 and 1933 foreign trade statistics. The value of exports of the non-ferrous metals and their products in 1933 totalled \$69,340,625, an increase of 44.1 per cent over a corresponding value of \$48,130,177 in the preceding year. Some of the more important 1933 value increases in these exports included a 61.5 per cent gain for aluminium and its products; 51.9 per cent for lead and its products; 213 per cent for nickel and its products and 33.9 per cent for zinc and its products. Destinations of these products included almost all of the metal consuming countries of the world, Canadian lead, for example, going in 1933, principally to the United Kingdom and in lesser quantities to the United States, British South Africa, Hong Kong, Argentina, Belgium, Brazil, China, Denmark, Germany, Japan, Netherlands, Portuguese Africa and other countries. Exports of the non-metallic minerals and their products increased 37.8 per cent from a value of \$9,657,909 in 1932 to \$13,308,957 in 1933. In this group, asbestos exports showed a value increase of 59.4 per cent, talc 36.3 per cent, mica 48.5 per cent, feldspar 49.2 per cent and magnesite (magnesian dolomite) 90.5 per cent. In 1933 exports of gold bullion were valued at \$56,002,261 of which \$40,804,715 went to the United Kingdom and \$15,197,546 to the United States. In 1932 similar exports were appraised at \$51,395,700, of which \$50,609,033 were destined for the United States. The increasing importance of gold production in Canada may perhaps be better appreciated when it is stated that \$84,350,237, the value of the 1933 output, was equivalent to 62.5 per cent of the interest paid on the total public debt of Canada for the fiscal year ending March 31 of that year.

Table 1.—Mineral Production of Canada, by Provinces, 1933 ⁽¹⁾

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	*Yukon	Canada
METALLICS										
Arsenic lb.				1,468,022						1,468,022
(As ₂ O ₃) \$				56,534						56,534
Bismuth.....lb.				7,580				70,723		78,303
\$				3,731				77,795		81,526
Cadmium.....\$								78,733		78,733
Chromite.....tons			30							30
\$			343							343
Cobalt.....lb.				466,702						466,702
\$				597,752						597,752
Copper.....lb.			69,943,882	145,504,720	33,163,181	3,223,941		43,146,724		299,982,448
\$			5,214,177	10,118,847	2,844,989	240,338		3,216,502		21,634,853
Gold....fine oz.	1,382		382,886	2,155,519	125,310	5,400	324	238,995	39,493	2,949,309
\$	28,568		7,914,956	44,558,531	2,590,388	111,628	6,698	4,940,465	816,392	60,967,626
Estimated ex- change equa- lization on gold pro- duced.....\$	10,957		3,035,583	17,089,312	993,478	42,812	2,569	1,894,792	313,108	23,382,611
Lead.....lb.				29,910				26,3345,776	3,099,505	266,475,191
\$				692				6,298,178	74,128	6,372,998
Nickel.....lb.				83,264,658						83,264,658
\$				20,130,480						20,130,480
Palladium, Rhodium, Iridium, etc. fine oz.				31,009						31,009
\$				645,043						645,043
Platinum fine oz.				24,746				40		24,786
\$				856,190				1,400		857,590
Selenium.....lb.			22,131	26,090						48,221
\$			16,600	53,745						70,345
Silver...fine oz.	104		471,419	4,535,680	1,101,578	114,084	32	6,737,057	2,204,237	15,187,950
\$	39		178,351	1,715,975	416,758	43,358	12	2,548,817	833,925	5,746,027
Zinc.....lb.					43,516,037	2,789,683		152,826,264		199,131,984
\$					1,397,082	89,563		4,906,487		6,393,132
Total.....\$	39,564		16,360,010	95,826,832	8,242,695	527,699	9,279	23,963,169	2,037,553	147,015,593

Yukon (*) Silver and petroleum produced in Northwest Territories included with Yukon.

(1) Unless otherwise noted all total values of mineral production from 1931 to 1933, inclusive, include estimated exchange equalization on gold produced.

Table 1.—Mineral Production of Canada, by Provinces, 1933—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	*Yukon	Canada
NON-METALLIC FUELS										
Coal..... tons	4,557,590	312,303			3,880	927,649	4,718,788	1,382,272	862	11,903,344
Coal..... \$	15,969,793	1,041,744			9,214	1,285,996	12,307,258	5,306,287	3,670	35,923,962
Natural M cu. ft.		618,033		7,166,659	600		15,352,811			23,138,103
gas..... \$		302,706		4,523,085	180		3,886,263			8,712,234
Peat..... tons			681	450						1,131
Peat..... \$			2,549	900						3,449
Petroleum, crude..... bbl		8,835		136,058			995,832			1,145,333
Petroleum, crude..... \$		18,111		253,486			2,844,157			3,138,791
Total..... \$	15,969,793	1,362,561	2,549	4,777,471	9,394	1,285,996	19,037,678	5,306,287	3,670	47,778,436
OTHER NON-METALLICS										
Asbestos..... ton			158,367							158,367
Asbestos..... \$			5,211,177							5,211,177
Barytes..... ton				20						20
Barytes..... \$				60						60
Bituminous ton							466			466
sands..... \$							1,662			1,662
Diatomite..... ton	1,747			28				14		1,789
Diatomite..... \$	34,940			1,298				410		36,648
Feldspar..... ton			6,183	4,387						10,658
Feldspar..... \$			59,283	45,350	88					105,117
Fluorspar..... ton				73	484					73
Fluorspar..... \$				1,064						1,064
Graphite..... ton				362						405
Graphite..... \$			2,222	10,145						18,367
Grindstones..... ton	21	277						200		498
Grindstones..... \$	868	12,051						9,000		21,919
Gypsum..... ton	315,948	30,391		24,460	6,830			5,107		382,736
Gypsum..... \$	363,528	88,500		112,319	65,471			46,004		675,822
Iron oxides ton			4,192					165		4,357
(ochre)..... \$			51,965					1,485		53,450
Magnesitic dolomite..... \$			360,128							360,128
Magnesium ton								120		120
sulphate..... \$								3,360		3,360
Mica..... lb.			511,467	1,331,430				45,500		1,888,397
Mica..... \$			39,060	9,371				853		49,284
Mineral imp. gal.			9,024	29,794						38,818
waters..... \$			3,094	2,347						5,441
Phosphate..... ton			105					2,109		2,214
Phosphate..... \$			805					4,670		5,475
Quartz..... ton	1,017		28,294	66,562	7,736	59,506		22,668		185,783
Quartz..... \$	1,447		109,533	86,146	23,507	59,506		17,681		297,820
Salt..... ton	34,278			244,107	1,499	231				280,115
Salt..... \$	161,889			1,755,087	18,388	4,510				1,939,874
Silica brick. M	453			183						636
Silica brick. \$	15,834			7,351						23,185
Soapstone..... \$			47,680							47,680
Sodium ton								559		559
carbonate..... \$								5,773		5,773
Sodium sulphate..... \$						485,416				485,416
Sulphur (*) ton			19,167	8,196				30,010		57,373
Sulphur (*) \$			146,261	81,960				282,078		510,299
Talc..... ton				15,114				67		15,181
Talc..... \$				142,134				1,022		143,156
Volcanic ton						118				118
dust..... \$						2,360				2,360
Total..... \$	578,506	100,551	6,031,208	2,260,632	107,850	551,792	1,662	372,336		10,004,537
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS										
Clay Products										
Brick—										
Soft mud process—										
Face..... M	60			2,292		11		119		2,482
Face..... \$	900			38,360		333		2,144		41,737
Common. M	480	678	1,241	6,796	1,091	23		2,080		12,389
Common. \$	5,680	9,992	9,862	87,644	16,035	369		27,187		156,769

(*) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

Table 1.—Mineral Production of Canada, by Provinces, 1933—Concluded

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	*Yukon	Canada
CLAY PRODUCTS, ETC.— <i>Conc.</i>										
Brick— <i>Conc.</i>										
Stiff mud process (wire cut)—										
Face..... M	422	118	7,234	11,660	70	17	64	17		19,602
\$	10,233	3,676	153,990	240,738	1,683	624	1,078	345		412,367
Common. M	1,671	411	17,483	3,191		62	711	365		23,894
\$	20,046	6,972	270,483	46,337		641	6,542	5,477		356,498
Dry press—										
Face..... M			601	3,302		8	476	157		4,544
\$			18,166	72,194		185	4,557	6,150		101,252
Common. M				1,834			2,082			3,916
\$				29,357			15,020			44,377
Fancy or ornamental brick.. M				6			624			630
\$				387			7,437			7,824
Sewer brick M				242					1	243
\$				3,683					10	3,693
Paving brick.... M									1	1
\$									42	42
Firebrick M						391	12	1,144		1,547
\$						19,705	506	53,015		73,226
Fireclay and other clay.. ton	22	4				371		1,024		1,421
\$	220	157				2,902		7,994		11,273
Fireclay blocks and shapes.. \$										
Structural tile—	75			90		64,381		16,079		80,625
Hollow blocks.... ton	1,759	65	7,676	8,196	44	201	628	8,178		26,747
\$	17,590	631	66,197	60,438	532	2,210	5,637	6,824		160,059
Roofing tile.... No.				20,469						20,469
\$				1,136						1,136
Floor tile (quarries) sq. ft.				81,808			9,687			91,945
\$				12,490			1,807			14,297
Drain tile... M	107	1	533	8,746	45		22	603		10,657
\$	3,237	64	15,420	179,015	2,716		1,249	21,128		222,829
Sewer pipe, copings, fluelinings, etc..... \$	67,519		45,890	185,048			35,793	20,208		354,458
Pottery, glazed or unglazed.. ton		25,425		52,650			118,747	5,678		202,500
Bentonite.... ton								55		55
\$								1,363		1,363
Other clay products.... \$			80	15,012		857		561		16,510
Total.. \$	125,500	46,917	580,688	1,024,579	20,966	92,207	198,373	174,205		2,262,835
OTHER STRUCTURAL MATERIALS										
Cement..... brl.			1,517,555	1,095,845	129,540		149,206	115,286		3,007,432
\$			2,128,900	1,587,812	295,351		299,530	225,342		4,536,935
Lime..... ton	3,914	16,849	110,334	146,193	18,032		7,501	20,717		323,540
\$	30,160	134,786	647,558	1,227,197	167,640		62,037	162,928		2,432,306
Sand and gravel.... ton	282,228	496,961	3,356,232	5,967,994	228,214	104,400	281,122	961,672		11,738,823
\$	126,031	331,497	942,429	2,517,230	108,828	19,731	85,577	332,962		4,464,285
Slate..... ton								250		250
\$								3,750		3,750
Stone..... ton	41,449	16,714	1,342,493	1,283,906	33,190		1,550	250,272		2,839,574
\$	96,629	131,370	1,448,740	983,268	74,227		8,817	253,525		2,996,576
Total.... \$	252,820	597,653	5,167,627	6,315,507	646,046	19,731	455,961	978,507		14,433,852
Grand Total (In Canadian Funds).... \$	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,504	2,041,223	221,495,253

Table 2.—Quantities and Values of Mineral Products from Canadian Sources
1932 and 1933 (¹)

	1932		1933		Per cent Increase (+) or Decrease (—)	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS						
		\$		\$		\$
Arsenic (As ₂ O ₃)..... lb.	2,424,342	98,714	1,468,022	56,534	— 39.5	— 42.7
Bismuth..... lb.	16,855	7,340	78,303	81,526	+ 364.6	+ 1,010.7
Cadmium..... lb.		26,824		78,733	+	+ 193.5
Chromite..... tons	78	1,113	30	343	— 61.5	— 69.2
Cobalt..... lb.	490,631	587,957	466,702	597,752	— 4.9	+ 16.7
Copper..... lb.	247,679,070	15,294,058	299,982,448	21,634,853	+ 21.1	+ 41.5
Gold..... fine oz.	3,044,387	62,933,063	2,949,309	60,967,626	— 3.1	— 3.1
Estimated exchange equalization paid for gold produced.....		8,546,310		23,382,611		+ 173.6
Lead..... lb.	255,947,378	5,409,704	266,475,191	6,372,998	+ 4.1	+ 17.8
Manganese ore..... tons						
Molybdenite..... lb.						
Nickel..... lb.	30,327,968	7,179,862	83,264,658	20,130,480	+ 174.6	+ 180.4
Palladium, Rhodium, Iridium, etc. fine oz.	37,613	901,890	31,009	645,043	— 17.6	— 28.5
Platinum..... fine oz.	27,343	1,099,393	24,786	857,590	— 9.4	— 22.0
Selenium..... lb.			48,221	70,345		
Silver..... fine oz.	18,347,907	5,811,081	15,187,950	5,746,027	— 17.2	— 1.1
Titanium ore..... tons						
Zinc..... lb.	172,283,558	4,144,454	199,131,984	6,393,132	+ 15.6	+ 54.3
Total..... \$		112,041,763		147,015,593		+ 31.2
NON-METALLICS—FUELS						
Coal..... tons						
Natural gas..... M cu. ft.	11,738,913	37,117,695	11,903,344	35,623,962	+ 1.4	— 3.2
Peat..... tons	23,420,174	8,899,462	23,138,103	8,712,234	— 1.2	— 2.1
Petroleum, crude..... brls.	3,248	7,593	1,131	3,449	— 65.2	— 54.6
Total..... \$	1,044,412	3,022,592	1,145,333	3,138,791	+ 9.7	+ 3.8
		49,047,342		47,778,436		— 2.6
OTHER NON-METALLICS						
Actinolite..... tons						
Asbestos..... tons	122,977	3,039,721	158,367	5,211,177	+ 28.8	+ 71.4
Barytes..... tons			20	60		
Bituminous sands..... tons	343	1,372	466	1,662	+ 35.9	+ 21.1
Diatomite..... tons	1,496	29,506	1,789	36,648	+ 19.6	+ 24.2
Feldspar..... tons	7,047	81,982	10,658	105,117	+ 51.1	+ 28.2
Fluorspar..... tons	32	464	73	1,064	+ 128.1	+ 129.3
Graphite..... tons	346	18,483	405	18,367	+ 17.1	— 0.6
Grindstones..... tons	328	15,735	498	21,919	+ 51.8	+ 39.3
Gypsum..... tons	438,629	1,060,379	382,736	675,822	— 12.7	+ 37.4
Iron oxides (ochres)..... tons	5,240	46,161	4,357	53,450	— 16.9	+ 15.8
Magnesitic dolomite.....		262,860		360,128		+ 37.0
Magnesium sulphate..... tons			120	3,360		
Mica..... tons	309	6,828	944	49,284	+ 205.5	+ 621.8
Mineral water..... imp. gal.	76,714	7,170	38,818	5,441	— 49.4	— 24.1
Phosphate..... tons	1,316	12,333	2,214	5,475	+ 68.2	+ 55.6
Quartz..... tons	189,132	276,147	185,783	297,820	+ 1.8	+ 7.9
Salt..... tons	263,543	1,947,551	280,115	1,939,874	+ 6.3	— 0.4
Silica brick..... M	93	4,304	636	23,185	+ 583.9	+ 438.7
Soapstone.....		46,751		47,680		+ 2.0
Sodium carbonate..... tons	495	5,450	559	5,773	+ 12.9	+ 5.9
Sodium sulphate.....		271,736		485,416		+ 78.6
Sulphur*..... tons	53,172	470,014	57,373	510,299	+ 7.9	+ 8.6
Talc..... tons	12,103	112,287	15,181	143,156	+ 25.4	+ 27.5
Volcanic dust..... tons	180	3,600	118	2,360	— 34.4	— 34.4
Total..... \$		7,740,837		10,004,537		+ 29.3
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS						
Brick—Soft mud process / Face..... M	6,188	108,582	2,482	41,737	— 59.9	— 61.6
Common..... M	12,801	182,372	12,389	156,789	— 3.2	— 14.0
Stiff mud process / Face..... M	30,197	664,766	19,602	412,367	— 35.1	— 38.0
(wire cut)..... Common..... M	40,753	638,922	23,894	356,498	— 41.4	— 44.2
Dry press..... Face..... M	5,522	119,547	4,544	101,252	— 17.7	— 15.3
Common..... M	4,248	46,762	3,916	44,377	— 7.8	— 5.1
Fancy or ornamental brick..... M	125	6,237	630	7,824	+ 404.0	+ 25.4
Sewer brick..... M	643	12,156	243	3,693	— 62.2	— 69.6
Paving brick..... M	6	155	1	42	— 83.3	— 72.9
Firebrick..... M	1,580	71,757	1,547	73,226	— 2.1	+ 2.1

(¹) Unless otherwise noted, all total values of mineral production from 1931 to 1933, inclusive, include estimated exchange equalization on gold produced.

† Includes grindstones, pulpstones and scythstones.

* Sulphur content of pyrites shipped and estimated sulphur contained in the sulphuric acid made from smelter gases.

Table 2—Quantities and Values of Mineral Products from Canadian Sources
1932 and 1933—Concluded

	1932		1933		Per cent Increase (+) or Decrease (—)	
	Quantity	Value	Quantity	Value	Quantity	Value
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—Concluded		\$		\$		\$
Fireclay and other clay..... tons	990	11,826	1,421	11,273	+ 43.5	— 4.7
Fireclay blocks and shapes.....		75,209		80,625	—	+ 7.2
Hollow blocks..... tons	48,118	421,672	26,747	160,059	— 44.4	— 62.0
Roofing tile..... No.	48,939	3,900	20,469	1,136	— 58.2	— 70.9
Floor tile (quarries)..... sq. ft.	94,316	21,502	91,495	14,297	— 3.0	— 33.5
Drain tile..... M	7,385	186,670	10,057	222,829	+ 36.2	+ 19.4
Sewer pipe, copings, flue linings, etc.....		813,224		354,458	—	— 56.4
Pottery, glazed or unglazed.....		244,861		202,500	—	— 17.3
Bentonite..... tons	7	176	55	1,363	+ 685.7	+ 674.4
Other clay products.....		19,932		16,510	—	— 17.2
Total..... \$		3,650,218		2,262,835		— 38.0
Cement..... brls.	4,498,721	6,930,721	3,007,432	4,536,935	— 33.2	— 34.5
Lime..... tons	320,650	2,394,537	323,540	2,432,306	+ 0.9	+ 1.6
Sand and gravel..... tons	14,469,942	4,480,596	11,738,823	4,464,285	— 18.9	— 0.4
Slate..... tons	256	3,750	250	3,750		
Stone—						
Granite..... tons	490,822	1,110,582	256,723	679,585	— 47.7	— 38.8
Limestone..... tons	3,687,241	3,227,715	2,572,911	2,142,516	— 30.2	— 33.6
Marble..... tons	12,379	250,706	10,897	65,913	— 12.0	— 73.7
Sandstone..... tons	500,480	349,458	99,043	108,562	— 80.2	— 68.9
Total..... \$		18,748,065		14,433,852		— 23.0
Grand Total (Canadian Funds) \$		191,228,225		221,495,253		+ 15.8

Table 3.—Monthly Average Exchange Quotations at Montreal 1932 and 1933

	New York Funds at Montreal		Sterling at Montreal		French Francs At Montreal	
	1932	1933	1932	1933	1932	1933
	\$	\$	\$	\$	\$	\$
January.....	1.174	1.143	4.028	3.847	.0462	.0447
February.....	1.145	1.197	3.959	4.099	.0452	.0471
March.....	1.118	1.199	4.034	4.134	.0440	.0473
April.....	1.112	1.179	4.173	4.234	.0439	.0486
May.....	1.131	1.141	4.157	4.498	.0465	.0526
June.....	1.153	1.112	4.205	4.615	.0454	.0536
July.....	1.148	1.058	4.076	4.931	.0450	.0581
August.....	1.142	1.061	3.975	4.787	.0448	.0572
September.....	1.108	1.036	3.847	4.839	.0435	.0604
October.....	1.096	1.024	3.723	4.787	.0431	.0597
November.....	1.148	0.990	3.760	5.082	.0450	.0620
December.....	1.154	0.995	3.787	5.096	.0452	.0611

Prices: Price advances were common in the non-ferrous metal group in 1933, but persistent declines continued among iron and steel and non-metallic mineral series, so that the index for articles of mineral origin—raw and partly manufactured—fell from 77.0 in 1932 to 75.6 in the following year. After opening at 75.8 in 1933, the index fell almost steadily till May when it stood at 74.1. From then onward the movement was generally upward although recessions occurred in August and again in October. By December this index had mounted to 77.3. Non-ferrous metals rose from 59.0 in 1932 to 64.3 in 1933, due chiefly to higher prices for copper, silver, lead, tin and zinc. On the other hand, non metallics fell from 85.5 to 84.4 chiefly because of price reductions for coal, coke, gasoline, and crushed stone.

Fine silver, at New York, reckoned in Canadian funds, averaged 37.6 in 1933, as compared with 31.7c per ounce in 1932. Electrolytic, domestic copper rose from \$7.52 to \$8.68 per 100 pounds carlots, f.o.b. Montreal. Domestic lead quoted on the same basis advanced from \$3.51 to \$3.71 per 100 pounds, and zinc, prime, western or g.o.b. grades moved up from \$3.72 to \$4.49 per 100 pounds. Tin ingots, Straits, were 16.3c. higher at 45.7c. per pound f.o.b. Toronto.

In the non-metallic group, American anthracite coal declined from \$13.00 to \$12.39 per gross ton, carlots, f.o.b. Toronto. Canadian bituminous, run of mine fell from \$5.81 to \$5.25 per ton, f.o.b. mines Nova Scotia, and from \$4.27 to \$3.76 per ton, f.o.b. mines British Columbia. Among asbestos products a slight advance occurred in quotations for fillers, floats and other short fibres which mounted from \$10.00 to \$11.33 per ton, f.o.b. mine. Motor gasoline, on a tank wagon basis, was quoted at the following prices at various Canadian cities: Halifax 1932, 20.0c. and 1933, 18.4c.; Montreal 17.6c. and 16.8c.; Toronto 17.9c. and 17.3c.; Winnipeg 20.2c. and 19.8c.; Regina 24.2c. and 23.8c.; Calgary 21.7c. and 20.9c.; and Vancouver 20.0c. and 20.2c. per gallon, respectively.

(Internal Trade Branch—Dominion Bureau of Statistics.)

Table 4.—Metal Prices, 1929-1933

Metal	Market	Unit	1929	1930	1931	1932	1933
			\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound....	0-08956	0-07667	0-06720	0-05592	0-06528
Arsenic, white.....	New York.....	Pound....	0-04	0-04	0-045	0-04	0-04
Cobalt.....	New York.....	Pound....	2-52	2-50	2-50	2-50	2-80
Cobalt oxide.....	New York.....	Pound....	2-10	2-00	1-75	1-35	1-35
	New York.....	Pound....	0-18107	0-12982	0-08116	0-05555	0-07025
Copper.....	Montreal.....	Pound....	0-19978	0-1498	0-10006	0-07516	0-08684
	London.....	Long ton..	84-921	61-528	42-093	35-962	36-359
Gold (in Canadian funds).....		Ounce....	20-67	20-67	21-55	23-47	28-60
	New York.....	Pound....	0-06833	0-05517	0-04243	0-03180	0-03869
Lead.....	Montreal.....	Pound....	0-06678	0-05496	0-04168	0-03511	0-03705
	London.....	Long ton..	23-246	18-007	12-958	11-913	11-670
Nickel.....	New York.....	Pound....	0-35	0-36	0-36	0-35	0-35
Platinum.....	London.....	Ounce....	67-655	45-358	35-665	*10-104	7-630
Silver.....	New York.....	Ounce....	0-52993	0-38154	0-287	0-27892	0-34727
Tin.....	New York.....	Pound....	0-45155	0-31694	0-24467	0-22017	0-39110
	St. Louis.....	Pound....	0-06512	0-04556	0-0364	0-02876	0-04029
Zinc.....	Montreal.....	Pound....	0-0687	0-05084	0-03961	0-03724	0-04488
	London.....	Long ton..	24-793	16-570	12-215	13-545	15-666

*All prices in dollars per unit excepting London copper, lead and zinc prices which are quoted in £ sterling per long ton, and the 1932 and 1933 price for platinum, which is quoted in £ sterling per fine ounce.

Table 5.—Annual Values of the Mineral Production of Canada, 1924-1933

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1924.....	209,583,406	22-71	1929.....	310,850,246	31-28
1925.....	226,583,333	24-18	1930.....	279,873,578	27-65
1926.....	240,437,123	25-61	1931.....	230,434,726	22-21
1927.....	247,356,695	25-99	1932.....	191,228,225	18-20
1928.....	274,989,487	28-07	1933.....	221,495,253	20-74

NOTE.—For years 1885 to 1923 see previous reports.

Table 6.—Annual Values of the Mineral Production of Canada, by Classes, 1924-1933

Year	Metallics	Non-metallics including fuels	Clay products and other structural materials	Total
	\$	\$	\$	\$
1924.....	102,406,528	71,796,009	35,380,869	209,583,406
1925.....	117,082,298	71,851,801	37,649,234	226,583,333
1926.....	115,237,581	85,240,144	39,959,398	240,437,123
1927.....	113,561,030	88,986,246	44,809,419	247,356,695
1928.....	132,012,454	93,239,852	49,737,181	274,989,487
1929.....	154,454,056	97,861,356	58,554,834	310,850,246
1930.....	142,743,764	83,402,349	53,727,465	279,873,578
1931.....	120,930,147	65,346,284	44,158,295	230,434,726
1932.....	112,041,763	56,788,179	22,398,283	191,228,225
1933.....	147,015,593	57,782,973	16,696,687	221,495,253

NOTE.—For years 1907-1923 see previous reports.

Table 7.—Values of the Mineral Production of Canada, by Provinces, 1924-1933

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1924..	23,820,352	1,960,260	10,136,504	86,398,656	1,534,249	1,128,100	22,344,940	52,298,533	952,812
1925..	17,625,612	1,743,858	24,284,527	87,980,436	2,276,759	1,076,392	25,318,866	64,485,242	1,791,641
1926..	28,873,792	1,811,104	25,956,193	84,702,296	3,073,528	1,193,394	26,977,027	65,622,976	2,226,813
1927..	30,111,221	2,148,535	28,870,403	89,982,962	2,888,912	1,455,225	29,309,223	60,801,170	1,789,044
1928..	30,524,392	2,198,919	37,037,420	99,584,718	4,186,853	1,719,461	32,531,416	64,496,351	2,709,957
1929..	30,904,453	2,439,072	46,358,285	117,662,505	5,423,825	2,253,506	34,739,896	68,162,878	2,905,736
1930..	27,019,367	2,383,571	41,215,220	113,530,976	5,453,182	2,368,612	30,427,742	54,953,320	2,521,588
1931..	21,081,157	2,176,910	35,964,537	97,975,915	10,057,808	1,931,880	23,580,901	35,480,701	2,184,917
1932..	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365	1,681,728	21,174,061	27,326,173	2,014,618
1933..	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,504	2,073,052

NOTE.—For years 1899-1923 see previous reports.

*Includes small production from Northwest Territories in 1932 and 1933.

Table 8.—Percentage of the Total Value of the Mineral Production of Canada, by Provinces, 1929-1933

Province	1929	1930	1931	1932	1933
Nova Scotia.....	9.94	9.65	9.24	8.9	7.7
New Brunswick.....	0.79	0.84	0.96	1.2	0.9
Quebec.....	14.93	14.73	15.65	13.4	12.7
Ontario.....	37.85	40.57	42.15	43.5	49.8
Manitoba.....	1.75	1.95	4.37	4.8	4.1
Saskatchewan.....	0.72	0.85	0.85	0.9	1.1
Alberta.....	11.17	10.87	10.34	11.6	8.9
British Columbia.....	21.92	19.64	15.50	14.7	13.9
*Yukon.....	0.93	0.90	0.94	1.0	0.9
Canada.....	100.00	100.00	100.00	100.00	100.00

*Includes small production from Northwest Territories in 1932 and 1933.

NOTE.—In the following provincial tables the value of gold includes the exchange equalization. For further information on the price of gold see chapter II.

Table 9.—Mineral Production of Nova Scotia,* 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	460	9,920	964	22,634	1,382	39,525
Silver..... fine oz.	48	14	47	15	104	39
Manganese ore..... tons	60	2,400				
NON-METALLICS—						
Barytes..... tons	16	363				
Coal..... tons	4,955,563	19,016,720	4,084,581	15,167,793	4,557,590	15,969,793
Diatomite..... tons	1,484	29,679	1,438	28,760	1,747	34,940
Grindstones..... tons			12	433	21	868
Gypsum..... tons	707,817	878,487	341,508	398,861	315,948	363,528
Quartz..... tons	3,116	6,836			1,017	1,447
Salt..... tons	27,718	143,761	31,897	150,708	34,278	161,889
Silica brick..... M	621	22,044			453	15,834
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		467,126		172,557		125,500
Lime—						
Quicklime..... tons	17,790	73,018	6,075	30,954	3,325	24,270
Hydrated..... tons	640	6,400	458	4,580	589	5,890
Sand and gravel..... tons	403,858	198,757	423,487	136,677	282,228	126,031
Stone..... tons	83,181	225,632	34,661	87,307	41,449	96,629
Total.....		21,081,157		16,201,279		16,966,183

*In 1933, 118,514 long tons of pig iron were produced from Newfoundland ores, the output in 1932 was 30,697 long tons, and in 1931 it was 101,393 long tons.

Table 10.—Mineral Production of New Brunswick, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Manganese ore..... tons	57	493				
NON-METALLICS—						
Coal..... tons	182,181	743,196	212,695	794,168	312,303	1,041,744
Grindstones..... tons	299	12,308	256	11,802	277	12,051
Gypsum..... tons	58,957	451,264	38,019	297,520	30,391	88,500
Manganese, bog..... tons	77	462				
Natural gas..... M cu. ft.	655,891	323,184	662,452	326,191	618,033	302,706
Petroleum..... tons	6,577	15,461	6,408	14,332	8,835	18,111
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		143,348		68,151		46,917
Lime—						
Quicklime..... tons	5,161	61,729	5,547	59,064	8,059	68,446
Hydrated..... tons	6,080	65,325	6,025	50,120	8,790	66,340
Sand and gravel..... tons	183,475	18,149	569,150	447,239	496,961	331,497
Stone..... tons	62,325	341,991	16,805	154,918	16,714	131,370
Total..... \$		2,176,910		2,223,505		2,107,682

Table 11.—Mineral Production of Quebec*, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Chromite..... tons			78	1,113	30	343
Copper..... lb.	68,376,985	5,723,154	67,336,692	4,296,216	69,943,882	5,214,177
Gold..... fine oz.	300,075	6,471,075	401,105	9,417,572	382,886	10,950,539
Selenium..... lb.					22,131	16,600
Silver..... fine oz.	530,345	158,414	628,902	199,184	471,419	178,351
Titanium ore, sold for export..... tons	1,509	10,261				
NON-METALLICS—						
Asbestos..... tons	164,296	4,812,886	122,977	3,039,721	158,367	5,211,177
Feldspar..... tons	10,381	86,842	3,390	39,062	6,183	59,283
Graphite..... tons					43	2,222
Iron oxides (ochre)..... tons	5,410	48,205	5,017	44,161	4,192	51,965
Magnesian dolomite..... tons		295,579		262,860		360,128
Mica..... tons	290	30,601	41	4,076	256	39,060
Natural mineral waters..... imp. gal.	19,868	4,746	15,506	4,697	9,024	3,094
Peat..... tons	1,170	5,937	762	2,286	681	2,549
Phosphate..... tons			1,316	12,333	105	805
Quartz..... tons	26,987	69,756	20,123	71,645	28,294	109,533
Sulphur..... tons	14,586	108,617	17,954	133,838	19,167	146,261
Soapstone.....		34,439		46,751		47,680
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	4,942,323	7,022,895	2,210,584	3,155,702	1,517,555	2,128,900
Clay products.....		2,360,908		1,064,551		580,088
Lime—						
Quicklime..... tons	101,186	720,049	76,983	493,787	89,740	539,603
Hydrated lime..... tons	10,310	84,169	16,830	94,114	20,594	107,555
Sand and gravel..... tons	7,657,964	1,952,959	3,458,128	893,896	3,356,232	942,429
Stone..... tons	4,265,529	5,893,042	2,246,825	2,360,901	1,342,493	1,448,740
Total..... \$		35,964,537		25,638,466		28,141,482

*There is also in this province an important production of aluminium from imported ores.

Table 12.—Mineral Production of *Ontario, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As ₂ O ₃)..... lb.	3,575,936	135,170	2,424,342	98,714	1,468,022	56,534
Bismuth..... lb.	7,331	3,532	16,798	7,289	7,580	3,731
Cobalt..... lb.	521,051	651,179	490,631	587,957	466,702	597,752
Copper..... lb.	112,882,625	9,096,463	77,055,413	5,407,928	145,504,720	10,118,847
Gold..... fine oz.	2,085,814	44,980,280	2,280,105	53,534,743	2,155,519	61,647,843
Lead..... lb.	985,633	41,647	86,477	1,828	29,910	692
Molybdenite..... lb.	1,222	280				
Nickel..... lb.	65,666,320	15,267,453	30,327,962	7,179,862	83,264,658	20,130,480
Palladium, Rhodium, etc..... fine oz.	46,918	1,217,717	37,613	90,890	31,009	645,043
Platinum..... fine oz.	44,725	1,595,117	27,284	1,067,021	24,746	856,190
Selenium..... lb.	16,892	32,108			26,090	53,745
Silver..... fine oz.	7,438,951	2,222,014	6,335,788	2,006,648	4,535,680	1,715,975
NON-METALLICS—						
Actinolite..... tons	35	456			20	60
Barytes..... tons					28	1,298
Diatomite..... tons	60	840	11	309		
Feldspar..... tons	7,962	100,119	3,657	42,920	4,387	45,350
Fluorspar..... tons	40	620	32	464	73	1,064
Graphite..... tons	548	32,149	346	18,483	362	16,145
Gypsum..... tons	53,358	374,469	35,655	186,175	24,460	112,319
Mica..... tons	1,049	23,465	269	2,752	666	9,371
Natural mineral waters..... imp. gal.	197,540	8,578	61,208	2,473	29,794	2,347
Natural gas..... M cu. ft.	7,419,534	4,635,497	7,386,154	4,719,297	7,166,659	4,523,085
Peat..... tons	504	1,096	2,486	5,307	450	900
Petroleum..... brls.	122,365	219,993	130,343	247,468	136,058	253,486
Quartz..... tons	97,888	148,642	66,135	93,574	66,562	86,146
Salt..... tons	231,329	1,760,388	231,138	1,789,751	244,107	1,755,087
Silica brick..... M	279	13,702	93	4,304	183	7,351
Sulphur..... tons	6,508	65,080	3,332	33,320	8,196	81,960
Talc..... tons	11,806	122,044	12,064	111,585	15,114	142,134
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	3,470,056	5,006,826	1,599,342	2,288,675	1,095,845	1,587,812
Clay products.....		3,552,800		1,639,508		1,024,579
Lime—						
Quicklime..... tons	113,376	842,274	143,185	1,018,007	126,460	1,006,906
Hydrated..... tons	34,284	379,996	23,518	255,223	19,733	220,291
Sand and gravel..... tons	7,465,017	2,562,477	6,994,447	1,971,239	5,967,994	2,517,230
Stone..... tons	3,359,364	2,881,444	1,905,138	1,655,016	1,253,906	983,268
Total..... \$		97,975,915		85,910,030		110,205,021

*The total production of blast-furnace pig-iron in Ontario in 1931 was 318,645 long tons, in 1932, 113,433 long tons and in 1933, 103,803 long tons.

†Sulphur content of pyrites shipped or estimated sulphur contained in the sulphuric acid made from smelter gases.

Table 13.—Mineral Production of Manitoba, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Copper..... lb.	45,821,432	3,835,254	52,706,861	3,362,803	38,163,181	2,844,989
Gold..... fine oz.	102,968	2,220,512	122,507	2,876,350	125,310	3,583,866
Selenium..... lb.	3,870	7,353				
Silver..... fine oz.	836,547	249,877	1,036,497	328,275	1,101,578	416,758
Zinc..... lb.	35,173,749	898,338	41,736,600	1,004,016	43,516,037	1,397,082
NON-METALLICS—						
Coal..... tons	1,306	3,797	1,552	3,684	3,880	9,214
Feldspar..... tons					88	484
Gypsum..... tons	23,076	231,124	12,719	113,739	6,830	65,471
Natural gas..... M cu. ft.	600	180	600	180	600	180
Quartz..... tons	67,214	76,624	87,453	102,493	7,736	23,507
Salt..... tons			508	7,092	1,499	18,388
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	544,160	1,267,893	242,112	549,594	129,540	295,351
Clay products.....		122,628		49,773		20,666
Lime—						
Quicklime..... tons	16,575	126,789	15,047	116,366	14,793	110,957
Hydrated..... tons	4,439	80,612	3,188	55,741	3,239	56,683
Sand and gravel..... tons	871,986	294,178	440,309	188,974	288,214	108,828
Stone..... tons	153,248	642,649	78,423	299,282	33,190	74,227
Total..... \$		10,057,808		9,058,365		9,026,951

Table 14.—Mineral Production of Saskatchewan, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Copper..... lb.					3,223,941	240,338
Gold..... fine oz.			11	258	5,400	154,440
Silver..... fine oz.			14	4	114,604	43,358
Zinc..... lb.					2,789,683	89,563
Coal..... tons	662,836	945,259	887,132	1,229,449	927,649	1,285,996
Quartz..... tons					59,506	59,506
Salt..... tons					231	4,510
Sodium sulphate..... tons		421,097		271,736		485,416
Volcanic dust..... tons	128	2,560	180	3,600	118	2,360
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products..... tons		166,257		109,739		92,207
Sand and gravel..... tons	1,388,594	396,707	362,841	66,942	104,400	19,731
Total..... \$		1,931,880		1,681,728		2,477,425

Table 15.—Mineral Production of Alberta, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	195	4,205	83	1,949	324	9,267
Silver..... fine oz.	29	9	9	3	32	12
NON-METALLICS—						
Bituminous sands..... tons	1,015	4,060	343	1,372	466	1,662
Coal..... tons	4,564,015	13,342,675	4,870,648	13,526,309	4,718,788	12,307,258
Natural gas..... M cu. ft.	17,798,698	4,067,893	15,370,968	3,853,794	15,352,811	3,886,263
Petroleum..... brls.	1,413,631	3,976,220	906,751	2,751,541	695,832	2,844,157
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	626,483	1,286,080	193,571	396,922	149,206	299,530
Clay products.....		529,716		329,584		198,373
Lime—						
Quicklime..... tons	5,056	46,047	6,529	55,326	7,403	61,061
Hydrated..... tons	62	738	113	1,241	98	976
Sand and gravel..... tons	1,050,988	313,616	734,067	250,025	281,122	85,577
Stone..... tons	2,496	9,642	1,428	2,985	1,550	8,817
Total..... \$		23,580,901		21,174,061		19,702,953

Table 16.—Mineral Production of British Columbia, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Bismuth..... lb.	110,876	154,118	57	51	70,723	77,795
Cadmium.....		180,958		26,824		78,733
Copper..... lb.	65,223,348	5,459,194	50,580,104	3,227,111	43,146,724	3,216,502
Gold..... fine oz.	160,069	3,451,865	199,004	4,672,428	238,995	6,835,257
Lead..... lb.	261,902,236	7,097,812	252,007,574	5,326,452	263,345,776	6,298,178
Platinum..... fine oz.	50	1,783	58	2,372	40	1,400
Selenium..... lb.	731	1,389				
Silver..... fine oz.	8,061,598	2,408,000	7,293,462	2,309,958	6,737,057	2,548,817
Zinc..... lb.	202,071,702	5,160,911	130,546,958	3,140,438	152,826,264	4,906,487
NON-METALLICS—						
Coal..... tons	1,876,406	7,150,996	1,681,490	6,392,801	1,382,272	5,306,287
Diatomite..... tons	66	2,270	47	440	14	410
Grindstones, pulpstones..... tons	322	25,795	60	3,500	200	9,000
Gypsum..... tons	20,544	176,173	10,728	84,084	5,107	46,004
Iron oxides (ochre)..... tons	110	1,000	223	2,000	165	1,485
Magnesium Sulphate..... tons					120	3,360
Mica..... tons					23	853
Phosphate..... tons					2,109	4,670
Quartz..... tons	516	1,227	15,621	8,435	22,668	17,681
Sodium carbonate..... tons	712	7,351	495	5,450	559	5,773
Sulphur*..... tons	29,013	255,760	31,886	302,856	30,010	282,078
Talc..... tons	30	600	39	702	67	1,022

*Sulphur content of pyrites shipped and estimated sulphur contained in the sulphuric acid made from smelter gases.

16.—Mineral Production of British Columbia, 1931-1933—Concluded

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	578,636	1,172,549	253,112	536,528	115,286	225,342
Clay products.....		498,505		216,355		174,205
Lime—						
Quicklime..... tons	20,364	165,078	14,902	141,998	18,147	144,479
Hydrated..... tons	9,462	82,191	2,250	18,003	2,570	18,449
Sand and gravel..... tons	2,726,704	914,322	1,487,513	525,604	961,672	332,962
Slate..... tons	250	5,000	250	3,750	250	3,750
Stone..... tons	471,717	1,075,784	407,642	378,052	250,272	253,525
Total		35,480,701		27,326,173		30,794,504

Table 17.—Mineral Production of the Yukon, 1931-1933

Product	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	44,310	955,539	40,608	953,438	39,493	1,129,500
Lead..... lb.	4,454,613	120,724	3,853,327	81,444	3,069,505	74,128
Silver*..... fine oz.	3,694,728	1,103,615	3,053,188	966,984	2,227,476	842,717
NON-METALLICS—						
Coal..... tons	904	5,039	808	3,491	862	3,670
†Petroleum, crude..... brls.			910	9,251	4,608	23,037
Total		2,184,917		2,014,618		2,073,952

*Contains a relatively small quantity of silver produced in Northwest Territories in 1932 and 1933.

†Produced in Northwest Territories in 1932 and 1933.

Table 18.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1929-1933

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Metal Mining Industry							
ALLUVIAL GOLD MINES							
1929.....	68	68	7,237,850	488	586,193	2,969	836,006
1930.....	79	79	5,881,620	394	612,369	8,272	877,778
1931.....	109	109	5,908,001	337	682,935	41,745	1,226,541
1932.....	120	120	7,306,130	373	665,711	38,840	1,211,018
1933.....	73	74	10,402,705	454	704,151	35,165	1,218,250
AURIFEROUS QUARTZ MINES							
1929.....	80	85	135,166,105	8,660	14,258,733	2,579,481	37,275,986
1930.....	54	56	119,758,057	8,401	14,034,620	2,364,102	39,771,739
1931.....	68	69	109,933,164	9,636	16,467,165	2,700,326	49,144,578
1932.....	100	100	58,167,335	10,442	17,686,584	3,031,494	58,645,572
1933.....	214	216	158,599,931	12,823	20,536,012	3,330,137	69,151,535

Table 18.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1929-1933—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
COPPER-GOLD-SILVER MINES							
1929.....	144	152	52,546,697	5,243	8,498,755	1,035,133	21,859,907
1930.....	61	68	45,844,395	5,694	9,156,759	1,272,262	15,629,564
1931.....	53	56	37,127,920	3,351	4,958,317	726,560	15,951,103
1932.....	28	30	14,793,372	3,076	3,770,627	463,463	11,143,759
1933.....	28	29	40,228,626	2,841	3,938,778	404,625	7,707,270
SILVER-COBALT MINES							
1929.....	27	32	15,820,435	1,149	1,532,333	407,952	3,918,316
1930.....	23	28	12,268,322	1,043	1,488,591	352,844	3,637,181
1931.....	22	26	9,352,520	786	1,149,689	227,467	1,925,593
1932.....	17	20	3,005,872	369	551,255	124,478	1,735,708
1933.....	12	14	3,365,755	242	322,281	83,565	1,071,602
SILVER-LEAD-ZINC MINES							
1929.....	149	168	50,573,661	4,153	6,482,392	793,139	22,748,089
1930.....	86	93	42,053,674	2,866	4,263,961	654,685	13,000,815
*1931.....	39	40	31,152,078	1,299	2,149,921	485,106	6,351,975
*1932.....	36	36	11,921,067	1,084	1,719,186	358,649	5,156,365
*1933.....	42	43	17,705,026	1,100	1,501,012	284,277	7,569,867
NICKEL-COPPER MINES							
1929.....	2	5	16,448,290	3,219	5,105,875	184,363	7,967,640
1930.....	2	5	26,194,605	3,483	5,388,783	200,151	8,460,556
1931.....	3	6	21,320,977	2,133	3,150,240	105,403	7,539,836
1932.....	3	6	23,137,638	1,210	1,776,190	96,670	3,174,208
1933.....	4	7	30,048,125	1,599	2,518,181	152,984	6,108,325
MISCELLANEOUS METAL MINES							
1929.....	8	8	6,050	94	42,837	10,217	6,400
1930.....	10	10	427,906	116	110,096	5,100	2,595
1931.....	7	7	444,179	32	25,694	576	13,434
1932.....	5	5	1,140,200	34	35,181	2,475	1,113
1933.....	5	5	563,500	24	14,275	1,178	343
NON-FERROUS METAL SMELTING AND REFINING							
1929.....	7	10	146,699,085	8,119	13,772,393	6,208,733	168,438,022
1930.....	10	13	175,010,686	8,626	13,796,124	6,465,897	155,635,664
1931.....	11	14	175,669,195	7,860	13,245,327	6,053,398	150,229,454
1932.....	10	13	149,708,860	5,343	8,778,970	4,435,394	138,722,129
1933.....	11	14	146,085,284	6,360	8,403,181	2,792,322	157,318,734
Total Metal Mining Industries							
1929.....	485	528	427,498,173	31,125	50,279,511	11,221,987	163,050,366
1930.....	325	352	427,439,265	30,623	48,851,303	11,323,313	137,015,892
1931.....	312	327	390,908,034	25,434	41,829,288	10,340,522	132,382,514
1932.....	319	336	269,180,464	21,931	34,983,704	8,551,463	119,790,072
1933.....	389	402	406,998,952	25,443	37,937,871	7,084,253	150,145,926

*Contains data relating to silver ores in Northwest Territories.

†Value added by smelting.

Table 18.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1929-1933—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Non-Metal Mining Industries, Including Fuels							
* FUELS							
COAL							
1929.....	357	413	141,766,727	29,739	42,376,378	3,657,355	59,584,545
1930.....	390	430	140,316,395	29,172	36,442,361	3,595,416	49,905,327
1931.....	412	452	135,712,866	27,860	28,802,428	3,090,487	37,762,927
1932.....	455	493	131,879,671	26,960	25,042,769	3,066,601	34,984,922
1933.....	496	547	125,740,790	25,375	22,378,736	3,214,632	33,805,148
NATURAL GAS							
1929.....	145	2,298	68,592,709	1,953	2,275,147	41,590	8,555,971
1930.....	124	2,280	70,548,353	1,941	2,349,703	33,811	8,447,385
1931.....	145	2,444	71,085,678	1,692	2,072,022	26,921	8,232,822
1932.....	160	2,418	75,187,066	1,351	1,738,949	32,912	8,188,966
1933.....	174	2,515	80,937,170	1,367	1,650,815	53,994	7,725,951
PETROLEUM							
1929.....	231	2,635	54,526,398	2,221	3,748,689	293,354	4,368,374
1930.....	234	2,324	63,300,244	1,869	3,337,754	363,998	6,481,847
1931.....	160	2,346	57,620,950	1,209	1,634,517	303,511	4,733,287
1932.....	175	2,210	48,568,562	655	776,163	120,842	3,467,538
1933.....	175	2,128	36,972,528	718	773,734	136,278	3,562,170
TOTAL FUELS							
1929.....	733	5,346	264,885,834	33,913	48,400,214	3,992,299	72,508,890
1930.....	748	5,034	274,164,992	32,982	42,129,818	3,993,225	64,834,559
1931.....	717	5,242	264,419,494	30,761	32,608,967	3,390,919	60,729,036
1932.....	790	5,121	255,635,299	28,966	27,557,881	3,220,355	46,641,486
1933.....	845	5,190	243,650,488	27,460	24,803,285	3,404,904	45,093,269
OTHER NON-METAL MINING INDUSTRIES							
ABRASIVES—NATURAL							
1929.....	9	9	790,791	154	152,805	18,942	122,684
1930.....	10	10	345,102	45	42,867	4,305	80,108
1931.....	8	8	569,772	31	25,837	3,906	73,452
1932.....	10	10	679,805	36	26,471	2,422	48,844
1933.....	9	10	53,556	19	7,796	1,034	60,927
ASBESTOS							
1929.....	7	8	33,248,957	3,391	4,410,535	1,335,610	13,172,581
1930.....	7	8	35,097,872	2,770	3,474,215	1,133,737	8,390,163
1931.....	7	8	40,164,005	1,675	1,836,115	849,047	4,812,886
1932.....	7	8	30,081,362	1,409	1,156,315	827,303	3,039,721
1933.....	7	8	21,109,967	1,629	1,279,093	771,327	5,211,177

*Production of peat for 1929-1933 included in the miscellaneous non-metallics.

Table 18.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1929-1933—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
<i>OTHER NON-METAL MINING INDUSTRIES—Concluded</i>							
FELDSPAR AND QUARTZ							
1929.....	38	40	1,223,075	488	353,891	41,462	901,998
1930.....	51	52	870,488	429	257,388	35,645	686,596
1931.....	33	36	1,342,668	166	135,809	20,996	490,119
1932.....	33	33	936,177	120	91,603	13,391	358,129
1933.....	28	28	1,143,792	146	117,037	26,327	402,937
GYPSUM							
1929.....	17	22	7,438,605	987	1,054,213	281,019	3,345,096
1930.....	16	18	8,796,865	822	781,639	201,409	2,818,788
1931.....	15	19	7,941,082	676	656,590	188,524	2,111,517
1932.....	11	17	8,054,148	478	368,484	122,926	1,080,379
1933.....	10	16	8,769,564	415	263,279	91,518	675,822
IRON OXIDES (OCHRE)							
1929.....	4	4	159,523	48	47,324	13,564	115,932
1930.....	4	4	150,704	43	41,238	13,929	83,873
1931.....	4	4	181,535	30	29,194	8,560	49,205
1932.....	4	4	203,863	26	22,909	5,993	46,161
1933.....	4	4	156,551	22	15,631	5,755	53,450
MICA							
1929.....	14	14	281,295	83	47,362	355	118,549
1930.....	13	13	441,744	244	63,316	1,102	96,004
1931.....	11	11	276,356	28	22,556	444	54,066
1932.....	5	5	119,670	9	7,884	50	6,828
1933.....	15	15	312,396	41	25,007	80	49,284
SALT							
1929.....	8	8	4,576,543	424	516,453	249,664	1,578,086
1930.....	8	8	4,685,542	381	455,539	197,313	1,694,631
1931.....	7	7	4,196,927	363	446,984	184,001	1,904,149
1932.....	7	8	3,805,008	345	455,049	176,836	1,947,551
1933.....	9	9	3,708,358	400	473,420	191,373	1,939,874
TALC AND SOAPSTONE							
1929.....	5	5	654,635	86	74,300	21,395	229,198
1930.....	6	6	614,384	141	79,472	16,369	186,216
1931.....	5	5	618,590	70	71,787	19,128	157,083
1932.....	5	5	703,532	83	76,577	17,930	159,038
1933.....	7	7	684,375	103	83,060	26,424	190,836
MISCELLANEOUS							
1929.....	38	38	4,042,638	506	545,216	79,463	1,502,574
1930.....	38	38	3,608,896	498	527,183	188,449	1,192,417
1931.....	34	34	5,457,930	275	297,394	205,149	1,247,697
1932.....	35	35	2,072,913	182	155,166	110,396	1,061,779
1933.....	40	40	4,202,736	297	241,999	176,512	1,234,629

Table 18.—Principal Statistics of the Mineral Industry in Canada by Industries, 1929-1933—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
<i>TOTAL OTHER NON-METAL MINING INDUSTRIES</i>							
1929.....	140	148	52,416,662	6,167	7,202,099	2,041,474	21,087,298
1930.....	153	157	54,611,604	5,373	5,722,857	1,792,258	15,228,796
1931.....	124	132	60,748,895	3,314	3,522,236	1,479,755	10,900,174
1932.....	117	125	43,659,533	2,688	2,330,433	1,277,247	7,748,480
1933.....	129	137	40,143,295	3,072	2,506,322	1,290,350	9,818,938

Total Non-Metal Mining Industries, Including Fuels

1929.....	873	5,494	317,302,496	40,080	55,602,313	6,033,773	93,596,188
1930.....	901	5,191	328,776,596	38,355	47,852,675	5,785,483	80,063,355
1931.....	841	5,374	325,168,359	34,075	36,031,233	4,870,674	61,629,210
1932.....	907	5,246	302,294,837	31,654	29,918,319	4,497,602	54,389,856
1933.....	974	5,327	283,796,783	30,532	27,309,607	4,695,254	54,912,205

Clay Products and Other Structural Materials

CLAY PRODUCTS

Brick, Tile and Sewer Pipe

1929.....	181	191	33,493,902	5,366	5,541,452	2,902,869	13,568,646
1930.....	186	198	32,757,926	4,870	4,807,380	1,910,899	10,296,960
1931.....	171	185	33,159,664	3,131	3,428,142	1,476,870	7,585,310
1932.....	143	159	24,910,020	1,622	1,469,270	569,515	3,405,295
1933.....	141	152	23,760,177	1,195	1,011,747	366,685	2,062,388

STONEWARE AND POTTERY

1929.....	4	4	696,154	155	177,620	17,515	326,408
1930.....	5	5	672,851	156	153,750	11,707	268,618
1931.....	4	4	659,500	128	113,108	9,568	255,978
1932.....	5	5	437,562	118	107,316	10,288	244,923
1933.....	5	5	451,703	117	90,146	10,636	200,447

*TOTAL CLAY PRODUCTS**

1929.....	186	196	34,190,056	5,520	5,727,014	2,920,384	13,904,643
1930.....	191	203	33,430,777	5,026	4,961,150	1,922,606	10,593,578
1931.....	175	189	33,819,164	3,259	3,541,250	1,488,438	7,841,288
1932.....	148	164	25,347,582	1,740	1,576,586	579,805	3,650,218
1933.....	146	157	24,211,880	1,312	1,101,893	577,321	2,262,835

OTHER STRUCTURAL MATERIALS

CEMENT

1929.....	8	11	50,881,818	2,546	3,523,595	4,347,219	19,337,235
1930.....	8	11	59,210,737	2,317	3,172,198	4,120,367	17,713,067
1931.....	9	12	57,378,436	1,820	2,432,950	3,280,870	15,826,243
1932.....	6	12	55,294,814	1,216	1,344,772	1,701,125	6,930,721
1933.....	6	12	54,403,379	740	781,746	982,087	4,536,935

*Includes kaolin and other clays.

Table 18.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1929-1933—Concluded

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
OTHER STRUCTURAL MATERIALS—Concluded							
LIME							
1929.....	46	53	7,404,677	1,382	1,393,092	1,183,313	5,908,610
1930.....	44	50	8,816,879	1,086	1,087,778	886,354	4,038,698
1931.....	54	60	7,289,990	799	785,868	612,278	2,764,415
1932.....	53	60	6,823,949	677	575,072	535,433	2,394,537
1933.....	54	60	8,920,042	696	480,833	473,125	2,432,306
SANDS AND GRAVEL							
1929.....	541	2,568	9,154,055	8,758	2,505,225	285,461	7,317,814
1930.....	724	2,993	7,550,217	5,601	2,508,037	331,010	8,344,913
1931.....	704	3,287	8,635,241	3,224	2,878,011	292,892	6,651,165
1932.....	688	4,249	9,542,446	1,743	1,322,201	190,477	4,480,596
1933.....	696	4,598	6,203,113	2,726	1,169,079	129,410	4,464,285
STONE							
1929.....	247	268	20,589,758	5,681	5,459,761	759,418	12,066,532
1930.....	285	305	22,196,388	6,192	5,542,211	697,060	13,037,209
1931.....	300	329	18,860,796	4,198	4,470,699	625,673	11,075,184
1932.....	296	319	16,727,481	2,509	2,051,395	420,581	4,942,211
1933.....	288	317	15,758,198	1,885	1,250,776	283,454	3,000,326
TOTAL OTHER STRUCTURAL MATERIALS							
1929.....	842	2,930	88,030,308	18,367	12,831,673	6,575,441	44,630,191
1930.....	1,061	3,359	97,774,221	15,196	12,310,224	6,034,791	43,133,887
1931.....	1,067	3,688	92,164,463	10,041	10,667,628	4,811,713	36,317,007
1932.....	1,043	4,640	88,388,690	6,145	5,893,440	2,847,616	18,748,065
1933.....	1,044	4,987	85,284,732	6,047	3,682,434	1,868,076	14,433,859
Total Clay Products and Other Structural Materials							
1929.....	1,028	3,126	122,220,364	23,897	18,608,687	9,495,825	58,534,834
1930.....	1,252	3,562	131,204,998	20,222	17,271,354	7,957,397	53,727,465
1931.....	1,242	3,877	125,983,627	13,300	14,108,778	6,298,151	44,158,295
1932.....	1,191	4,804	113,736,272	7,885	6,870,026	3,427,419	22,398,283
1933.....	1,190	5,144	109,486,612	7,359	4,784,327	2,245,397	16,696,667
GRAND TOTAL OF ALL INDUSTRIES							
1929.....	2,386	9,148	867,021,033	95,102	124,490,511	26,751,585	315,181,388
1930.....	2,478	9,105	887,420,859	89,200	113,975,332	25,066,193	270,806,712
1931.....	2,395	9,578	842,060,020	72,809	91,969,299	21,509,348	238,170,019
1932.....	2,417	10,380	685,211,573	61,470	71,772,049	16,476,484	196,578,211
1933.....	2,553	10,873	800,292,347	63,334	70,031,805	14,024,904	221,754,818

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1929-1933

Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
		\$		\$	\$	\$
NOVA SCOTIA						
1929.....	98	67,356,948	14,738	21,035,230	2,436,137	28,529,875
1930.....	125	65,363,756	15,484	19,284,197	2,410,115	25,043,071
1931.....	244	63,853,580	14,871	15,302,444	2,020,666	19,258,296
1932.....	495	63,415,735	13,706	11,302,801	2,047,874	15,049,226
1933.....	595	59,727,371	13,915	9,852,765	2,219,236	15,744,102
NEW BRUNSWICK						
1929.....	93	4,945,074	1,361	1,236,726	168,830	2,407,456
1930.....	113	5,349,073	1,391	1,132,306	162,561	2,350,372
1931.....	116	5,543,570	1,197	1,048,860	163,893	2,137,832
1932.....	563	4,998,656	1,480	1,123,080	96,222	2,185,174
1933.....	399	5,185,718	1,622	1,402,114	83,493	2,088,331
QUEBEC						
1929.....	2,426	146,332,805	19,678	16,886,275	6,703,881	57,313,685
1930.....	2,416	140,286,034	15,397	15,190,714	5,885,600	51,673,630
1931.....	2,723	146,067,130	11,141	12,666,586	5,607,812	44,064,907
1932.....	2,487	121,200,895	7,694	8,198,379	4,243,362	32,834,588
1933.....	3,064	127,600,093	8,629	8,621,984	2,953,543	33,888,539
ONTARIO						
1929.....	5,417	302,937,672	24,924	34,897,624	9,766,197	116,174,844
1930.....	5,267	326,396,783	24,706	34,433,915	9,022,652	105,434,625
1931.....	5,409	305,883,585	20,277	30,470,475	7,508,844	98,509,571
1932.....	5,196	244,250,088	16,376	24,412,126	5,447,055	85,868,259
1933.....	5,210	310,789,173	17,306	25,600,168	4,891,054	109,060,404
MANITOBA						
1929.....	51	18,020,285	1,819	2,375,990	992,386	5,423,628
1930.....	135	35,812,839	3,021	4,372,044	1,205,288	5,665,008
1931.....	107	39,113,921	2,059	3,096,332	796,076	15,122,432
1932.....	133	21,349,000	1,730	2,109,017	479,993	11,396,818
1933.....	120	30,130,497	1,379	1,847,251	234,202	8,433,130
SASKATCHEWAN						
1929.....	126	6,097,476	1,421	1,139,373	173,677	2,211,708
1930.....	144	6,424,080	1,371	1,040,790	229,760	2,333,280
1931.....	111	7,136,859	1,082	896,131	222,526	1,876,284
1932.....	115	6,013,271	924	748,782	152,433	1,626,307
1933.....	134	12,368,385	1,265	1,111,001	238,898	2,614,337
ALBERTA						
1929.....	558	142,942,397	13,824	19,915,537	1,476,468	33,883,239
1930.....	562	149,974,382	12,675	16,272,916	1,407,136	29,933,896
1931.....	553	141,629,189	10,579	11,357,722	1,198,890	23,021,495
1932.....	567	124,484,909	9,692	10,476,449	804,137	20,701,075
1933.....	575	112,666,472	9,057	9,463,382	805,577	18,945,255
BRITISH COLUMBIA						
1929.....	355	170,575,223	16,882	26,073,143	4,943,945	66,256,597
1930.....	319	150,279,895	14,836	21,412,925	4,652,217	45,768,150
1931.....	309	127,009,722	11,297	16,345,887	3,874,529	31,925,780
1932.....	819	91,469,101	9,582	12,642,830	3,094,145	25,071,738
1933.....	765	129,665,431	9,845	11,455,946	2,537,066	29,464,365
YUKON						
1929.....	24	7,813,153	455	930,613	90,064	2,980,356
1930.....	24	7,534,017	319	835,525	90,834	2,583,481
(a) 1931.....	6	5,822,464	296	784,862	116,112	2,253,422
(a) 1932.....	5	8,029,918	286	761,585	110,563	1,845,026
(a) 1933.....	11	12,159,207	309	677,194	41,835	1,516,355
Canada						
1929.....	9,148	867,021,033	95,102	124,490,511	26,751,585	315,181,388
1930.....	9,105	887,420,859	89,200	113,975,332	25,066,193	270,785,513
1931.....	9,578	842,060,020	72,809	91,969,299	21,509,348	238,170,019
1932.....	10,356	635,211,573	61,470	71,772,049	16,476,484	196,578,211
1933.....	10,873	800,292,347	63,334	70,031,805	14,024,904	221,754,818

(a) Contains data for Northwest Territories.

NOTE—The increases in column 1 in 1932 for Nova Scotia, New Brunswick and British Columbia were mainly accounted for by more detailed information received from the Provincial Highways Departments on the number of gravel pits in use during the year.

Table 20.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1932 and 1933

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1932					\$	\$	\$
Nova Scotia.....	440	52	13,214	13,706	885,128	10,417,673	11,302,801
New Brunswick.....	66	16	1,398	1,480	135,850	987,230	1,123,080
Quebec.....	651	75	6,968	7,694	1,396,131	6,802,248	8,198,379
Ontario.....	1,449	200	14,727	16,376	3,878,765	20,533,361	24,412,126
Manitoba.....	114	3	1,613	1,730	261,349	1,844,668	2,106,017
Saskatchewan.....	69	8	847	924	149,054	599,728	748,782
Alberta.....	770	83	8,839	9,692	1,750,314	8,726,135	10,476,449
British Columbia.....	839	72	8,654	9,565	1,690,107	10,632,044	12,612,151
Yukon.....	21	2	280	303	65,473	726,791	792,264
Canada.....	4,419	511	56,540	61,470	10,502,171	61,269,878	71,772,049
1933							
Nova Scotia.....	390	56	13,469	13,915	799,660	9,053,105	9,852,765
New Brunswick.....	63	17	1,549	1,629	134,678	1,267,436	1,402,114
Quebec.....	681	79	7,869	8,629	1,275,169	7,346,815	8,621,984
Ontario.....	1,396	211	15,699	17,306	3,629,139	21,971,029	25,600,168
Manitoba.....	114	6	1,259	1,379	219,392	1,627,898	1,847,251
Saskatchewan.....	72	9	1,184	1,265	149,460	961,541	1,111,001
Alberta.....	725	84	8,248	9,057	1,551,332	7,912,050	9,463,382
British Columbia.....	931	105	8,809	9,845	1,880,953	9,574,993	11,455,946
Yukon.....	31	2	276	309	98,042	579,152	677,194
Canada.....	4,403	569	58,362	63,334	9,737,825	60,293,980	70,031,805

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous year, is the sum of these individual averages.

Table 21.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1932-1933

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1932					\$	\$	\$
METAL MINING							
Alluvial Gold Mines.....	25	1	347	373	51,420	614,291	665,711
Auriferous Quartz Mines.....	598	35	9,809	10,442	1,883,445	15,803,139	17,686,584
Copper-Gold-Silver Mines.....	139	4	2,933	3,076	350,866	3,419,761	3,770,627
Silver-Cobalt Mines.....	33	1	335	369	107,850	443,405	551,255
Silver-Lead-Zinc Mines.....	105	10	969	1,084	266,343	1,452,843	1,719,186
Nickel-Copper Mines.....	43	.....	1,167	1,210	153,109	1,623,081	1,776,190
Miscellaneous Metal Mines.....	5	.....	29	34	8,335	26,846	35,181
Non-ferrous Smelting and Refining.....	675	64	4,604	5,343	1,690,710	7,088,260	8,778,970
NON-METAL MINING, INCLUDING FUELS							
Fuels							
Coal.....	1,254	109	25,597	26,960	2,779,328	22,263,441	25,042,769
Natural Gas.....	443	128	780	1,351	844,193	894,756	1,738,949
Petroleum.....	104	17	534	655	216,871	559,292	776,163
Other Non-Metal Mining							
Abrasives—natural.....	7	2	27	36	11,671	14,800	26,471
Asbestos.....	110	26	1,273	1,409	279,950	876,365	1,156,315
Feldspar and Quartz.....	18	2	100	120	32,462	59,141	91,603
Gypsum.....	40	6	432	478	90,418	278,066	368,484
Iron oxides.....	1	.....	25	26	3,240	19,669	22,909
Mica.....	1	.....	8	9	1,750	6,114	7,864
Salt.....	46	16	283	345	133,449	321,600	455,049
Talc and Soapstone.....	6	2	75	83	20,422	56,155	76,577
Miscellaneous.....	29	6	147	182	54,822	100,344	155,166

Table 21.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1932-1933—Concluded

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
					\$	\$	\$
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	96	7	1,113	1,216	213,891	1,130,881	1,344,772
Clay Products.....	265	39	1,436	1,740	565,675	1,010,911	1,576,586
Lime.....	63	7	607	677	106,150	468,922	575,072
Sand and Gravel.....	87	5	1,651	1,743	165,218	1,156,983	1,322,201
Stone.....	226	24	2,259	2,569	470,583	1,580,812	2,051,395
Total.....	4,419	511	56,540	61,470	10,502,171	61,269,878	71,772,049
1933							
METAL MINING							
Alluvial Gold Mines.....	19	3	432	454	49,430	654,721	704,151
Auriferous Quartz Mines.....	873	70	11,880	12,823	2,232,508	18,303,504	20,536,012
Copper-Gold-Silver Mines.....	154	5	2,682	2,841	306,363	3,632,415	3,938,778
Silver-Cobalt Mines.....	24	1	217	242	59,929	262,352	322,281
Silver-Lead-Zinc Mines.....	129	9	962	1,100	278,933	1,222,079	1,501,012
Nickel-Copper Mines.....	56	3	1,540	1,599	166,531	2,351,650	2,518,181
Miscellaneous Metal Mines.....	5	—	19	24	3,312	10,963	14,275
Non-ferrous Smelting and Refining.....	596	83	5,681	6,360	1,461,380	6,941,801	8,403,181
NON-METAL MINING, INCLUDING FUELS							
Fuels							
Coal.....	1,161	122	24,092	25,375	2,477,415	19,901,321	22,378,736
Natural Gas.....	464	124	779	1,367	817,952	832,863	1,650,815
Petroleum.....	91	20	607	718	194,762	578,972	773,734
Other Non-Metal Mining							
Abrasives—natural.....	1	—	18	19	1,500	6,296	7,796
Asbestos.....	118	22	1,489	1,629	261,684	1,017,409	1,279,093
Feldspar and Quartz.....	20	3	123	146	34,979	82,058	117,037
Gypsum.....	21	4	390	415	48,942	214,337	263,279
Iron Oxides.....	1	1	20	22	3,212	12,419	15,631
Mica.....	2	1	38	41	2,242	22,765	25,007
Salt.....	46	17	337	400	144,454	328,966	473,420
Talc and Soapstone.....	8	2	93	103	24,096	58,964	83,060
Miscellaneous.....	34	10	253	297	62,364	179,635	241,999
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	80	5	655	740	160,680	621,066	781,746
Clay Products.....	207	32	1,073	1,312	440,966	660,927	1,101,893
Lime.....	57	8	631	696	85,861	394,972	480,833
Sand and Gravel.....	58	3	2,665	2,726	106,761	1,062,318	1,169,079
Stone.....	178	21	1,686	1,885	311,569	939,207	1,250,776
Total.....	4,403	569	58,362	63,334	9,737,825	60,293,980	70,031,805

* See footnote to table 20.

Table 22.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment During 1932, whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	501	51	9	7	10,402	5	264	492	60	87	395	39
New Brunswick.....	67	12	11	312	46	45	804	2	18	945	77	
Quebec.....	250	500	426	180	2,946	213	104	1,703	373	613	4,003	191
Ontario.....	495	112	789	86	9,906	207	160	1,728	185	3,010	1,591	648
Manitoba.....	38	7	105	26	380	10	91	127	39	868	119	207
Saskatchewan.....	70	4	30	6	709	30	2	189	16	3	431	97
Alberta.....	785	9	141	368	9,768	39	67	163	19	573	211	35
British Columbia.....	1,278	2	169	20	5,848	1	146	8	.....	3,089	11	33
†Yukon.....					3					162	255	16
Canada.....	3,484	685	1,681	704	40,274	551	879	5,214	694	8,423	7,961	1,343
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....			3		208			4		265	261	33
Auriferous Quartz Mines.....			370	8	7,618	22	280	942	14	1,718	44	279
Copper-Gold-Silver Mines.....					1,950			249		1,153	8	137
Silver-Cobalt Mines.....					391			87		6		6
†Silver-Lead-Zinc Mines.....	766				101					236	20	16
Nickel Copper Mines.....					1,414			253		3	72	2
Miscellaneous Metal Mines.....					37					20	5	
Non-Ferrous Smelting and Refining.....	62	36	267	14	1,490			378		3,564	161	44
Non-Metal Mining, Including Fuels—												
Fuels—												
Coal.....	1,430	10	85	37	24,446	42	326	946	16	80	524	129
Natural Gas.....	184		2	332	135	2	75	212	2	27	58	38
Petroleum.....	54	2			148	10	5	21	19	441	29	5
Other Non-metal Mining—												
Abrasives—natural.....	10				20						39	
Asbestos.....		441						199			1,132	3
Feldspar and Quartz.....				24	13		6	96			127	
Gypsum.....	109	18	34	15	9	36	3	361	65		75	82
Iron Oxides.....	7		13				7				12	4
Mica.....						2				5		
Salt.....	12	2	5	2	23	2	12	27		2	169	54
Talc and Soapstone.....			3							19	64	3
Miscellaneous.....	3	2			23		2		45	16	184	14
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	181	9	233	25	528	2	7	36	4	211	131	96
Clay Products.....	277	65	247	116	359	124	49	416	297	225	446	141
Lime.....	70	21	66	3	224			196	20	41	223	66
Sand and Gravel.....	63	70	75	6	329	33	16	120		23	2,717	43
Stone.....	256	9	278	122	808	276	91	671	182	367	1,455	148
Total.....	3,484	685	1,681	704	40,274	551	879	5,214	694	8,423	7,961	1,343

†Contains data on mining of silver-pitchblende ores in Northwest Territories.

Table 23.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment During 1933 whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	109	24	8	9	9,774	1,210	253	366	118	90	3,194	25
New Brunswick.....	86	1	4	41	1,063	18	.....	300	13	1	653	66
Quebec.....	545	625	346	144	3,574	176	110	1,515	105	649	4,223	389
Ontario.....	880	49	257	403	9,596	234	985	1,745	2,666	1,385	995	664
Manitoba.....	82	3	45	20	711	29	101	135	.....	468	39	126
Saskatchewan.....	521	5	10	40	734	25	21	184	7	148	287	69
Alberta.....	876	12	266	174	9,260	10	91	91	25	519	285	24
British Columbia.....	3,514	154	370	528	3,632	104	142	281	49	2,169	21	318
†Yukon.....	11	.....	.....	.....	39	.....	.....	16	.....	74	259	32
Canada.....	6,624	873	1,306	1,359	38,383	1,806	1,703	4,633	2,983	5,503	9,956	1,713
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....	18	.....	.....	17	237	.....	12	25	.....	146	259	30
Auriferous Quartz Mines.....	33	4	25	333	7,531	123	420	1,737	1,032	2,227	284	545
Copper-Gold-Silver Mines.....	3	141	226	.....	1,491	205	49	215	.....	835	2	16
Silver-Cobalt Mines.....	1	.....	.....	.....	180	.....	.....	69	.....	6	.....	13
Silver-Lead-Zinc Mines.....	683	.....	.....	.....	195	.....	15	17	.....	288	9	33
Nickel-Copper Mines.....	14	.....	.....	3	1,784	.....	185	106	.....	37	131	297
Miscellaneous Metal Mines.....	3	.....	.....	.....	23	5	.....	1	.....	8	7	1
Non-Ferrous Smelting and Refining.....	2,215	111	231	.....	1,058	.....	411	189	1,542	819	117	40
NON-METAL MINING, INCLUDING FUELS—												
Fuels—												
Coal.....	2,009	22	244	575	22,395	1,219	333	492	16	80	489	20
Natural Gas.....	207	3	1	192	157	12	53	159	2	16	167	65
Petroleum.....	152	7	6	.....	116	1	2	17	16	425	49	6
Other Non-metal Mining—												
Abrasives—natural.....	.....	.....	.....	.....	34	.....	.....	2	.....	.....	40	.....
Asbestos.....	.....	432	.....	.....	346	.....	5	167	.....	.....	1,096	3
Feldspar and Quartz.....	6	6	2	2	8	1	5	42	2	3	163	21
Gypsum.....	91	12	9	28	226	7	10	216	106	28	49	27
Iron Oxides.....	9	.....	1	.....	11	1	3	.....	.....	2	12	.....
Mica.....	10	25	11	12	46	26	7	7	6	.....	9	.....
Salt.....	10	25	11	12	158	2	7	41	1	3	114	23
Talc and Soapstone.....	18	1	5	.....	1	.....	1	.....	21	1	54	35
Miscellaneous.....	13	2	2	2	91	3	21	37	.....	56	197	54
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	105	21	50	78	412	36	8	.....	1	121	72	63
Clay Products.....	400	34	169	44	334	94	55	280	89	184	257	174
Lime.....	77	17	36	4	211	2	2	153	7	16	223	68
Sand and Gravel.....	186	12	19	3	507	20	17	9	.....	46	5,356	23
Stone.....	371	23	269	66	865	49	89	652	138	156	800	156
Total.....	6,624	873	1,306	1,359	38,383	1,806	1,703	4,633	2,983	5,503	9,956	1,713

†Contains data on mining of silver-pitchblende ores in Northwest Territories.

Table 24.—Fuel and Electricity Used in the Mineral

Industry	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Can- adian	Im- ported		Can- adian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	Tons
METAL MINING						
Alluvial Gold Mines.....	Quantity	2				
	\$	520				
Auriferous Quartz Mines.....	Quantity	701	18,326	405	1,279	160
	\$	7,028	159,425	7,537	10,173	2,399
Copper-Gold-Silver Mines.....	Quantity	6,026	106	170		49
	\$	49,352	1,934	2,247		528
Silver-Cobalt Mines.....	Quantity	1,236	261			
	\$	15,258	4,042			
*Silver-Lead-Zinc Mines.....	Quantity	15,097	10			6
	\$	72,907	320			69
Nickel-Copper Mines.....	Quantity	347	1,531	155		
	\$	2,306	8,923	2,397		
Miscellaneous Metal Mines.....	Quantity	264				
	\$	1,055				
†Non-Ferrous Smelting and Refining.....	Quantity	91,171	17,680	172		5,205
	\$	505,790	102,716	2,646		51,395
Total.....	Quantity	113,606	38,881	1,173	1,279	5,420
	\$	638,438	288,776	19,189	10,173	54,391
NON-METAL MINING, INCLUDING FUELS						
<i>Fuels</i>						
Coal.....	Quantity	584,954		108,911		
	\$	1,842,533		105,598		
Natural Gas.....	Quantity		35	7		
	\$		351	102		
Petroleum.....	Quantity	1,119				
	\$	3,369				
Total.....	Quantity	586,075	35	7	108,911	
	\$	1,845,902	351	102	105,598	
<i>Other Non-Metal Mining</i>						
Abrasives—natural.....	Quantity	208		10		
	\$	1,413		37		
Asbestos.....	Quantity	19,763	1,706	5,086		630
	\$	125,443	12,915	35,179		7,500
Feldspar and Quartz.....	Quantity	171	734			1
	\$	1,083	3,827			6
Gypsum.....	Quantity	4,341	1,080		357	287
	\$	22,115	6,225		2,678	2,600
Iron Oxides.....	Quantity	24		15		
	\$	167		240		
Mica.....	Quantity					
	\$					
Salt.....	Quantity	2,808	36,829			
	\$	11,006	153,285			
Talc and Soapstone.....	Quantity					
	\$					
Miscellaneous.....	Quantity	4,628	100	2	696	
	\$	30,038	1,300	31	2,633	
Total.....	Quantity	31,945	40,452	5,103	1,062	918
	\$	191,265	177,552	85,450	5,348	10,106
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement.....	Quantity	120,296	90,718			
	\$	652,734	440,546			
Clay Products.....	Quantity	11,752	50,440	1,142	3,082	596
	\$	72,277	306,833	8,495	8,808	4,386
Lime.....	Quantity	24,351	34,423	280		6,659
	\$	151,303	151,863	2,100		40,871
Sand and Gravel.....	Quantity	8,689	7,484		134	29
	\$	50,319	45,102		540	166
Stone.....	Quantity	1,805	7,488	695	201	55
	\$	13,324	47,096	5,319	995	563
Total.....	Quantity	166,893	190,553	2,117	3,417	7,339
	\$	939,957	991,440	15,914	10,343	45,986
Canada.....	Quantity	898,515	269,921	8,400	114,670	13,677
	\$	3,615,562	1,458,119	70,655	131,462	110,483

* Includes data on silver-pitchblende ores in Northwest Territories.

†In addition 230,039 tons of coal valued at \$1,675,067 and 97,097 tons of coke valued at \$957,159 were used for furnace charges.

Industry in Canada, by Kinds and by Industries, 1932

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.		K.W.H.	\$	K.W.H.
5,482	173	5,160	2,816						12,257,230
2,341	174	431	35,374					38,840	
94,341	9,520	1,785,206	30,221	5,013			314,326,323	3,031,494	14,899,377
29,699	2,666	172,316	121,718	1,558		78	2,516,897		25,341,475
56,435	2,656	310,930	1,024				128,916,568	463,463	
16,940	687	16,012	2,159				373,604		
6,969	88	11,601	708				6,864,470		
2,093	21	1,779	3,751			16,601	80,903	124,478	
5,101	1,345	348,170	4,731				37,570,680		6,878,557
4,327	671	90,936	9,932				179,487	358,649	
432	1,357	32,104	88				33,449,636		
124	288	2,957	640				79,035	96,670	
1,900			500						
420			1,000					2,475	
52,646	9,476	7,641,044	3,450	162,233			978,784,118		88,811,728
16,236	1,992	310,596	16,760	17,616		12,973	3,396,674	4,435,394	
223,366	24,615	10,134,215	39,280	167,246			1,499,911,795		148,188,367
72,186	6,499	595,027	191,364	19,174		29,652	6,626,600	8,551,463	
59,742	3,773	3,362					78,529,820		47,311,377
14,557	775	420					1,102,718	3,066,601	
12,738		17,110	6		55,126		10,637		
3,546		1,811	46		26,794		262	32,912	
4,846	44	12,240	264		1,641,014		1,292,849		1,110,805
1,164	9	753	1,204		96,567		17,776	120,842	
77,826	3,817	32,712	270		1,696,140		79,833,316		48,422,182
19,267	784	2,984	1,260		123,361		1,120,756	3,220,355	
300		500	100				7,200		
62		50	500				360	2,422	
17,500	2,701	78,719					44,519,239		
2,877	525	5,651					637,213	827,303	
3,030	274	3,900	8				225,010		58,140
729	57	536	46				7,107	13,391	
58,152	542	189,405	27		4,084		4,012,565		145,297
13,931	121	10,110	162		1,674		63,310	122,926	
	35	745	441				180,474		
	7	78	3,087				2,414	5,963	
			50					50	
80	52	85,008					747,106		1,764,567
20	10	5,702					6,813	176,836	
			67				978,926		
25,659	853	864,137	338				17,592	17,930	
4,722	182	54,554	339				1,322,230		33,761
			1,177			14	15,745	110,396	
104,721	4,457	1,222,414	992		4,084		51,992,750		2,001,765
22,341	902	76,681	5,360		1,674	14	750,554	1,277,247	
87,050	826	7,386					85,630,342		
15,856	138	960					590,891	1,701,125	
11,246	959	15,614	15,764		178,650		6,386,154		62,122
2,677	246	1,869	61,149		6,280		106,783	579,803	
2,665	55	250,322	33,284	35,044	8,000		6,241,789		586,822
587	11	8,524	121,318	2,803	4,340		51,713	535,433	
63,309	570	357,306	25		3		3,579,086		
12,709	98	13,267	111		12		68,153	190,477	
176,699	2,298	40,825	2,675				24,508,215		186,285
38,641	666	2,933	10,788				300,256	420,581	
340,569	4,708	671,453	51,748	35,044	186,653		126,345,566		835,229
70,470	1,159	27,553	193,366	2,803	10,632		1,117,796	3,427,419	
745,922	37,597	12,060,794	92,290	202,290	1,886,877		1,758,083,427		199,417,513
184,258	9,344	702,245	391,346	21,977	135,667	29,666	9,615,706	16,476,484	

Table 25.—Fuel and Electricity Used in the Mineral

Industry	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Can- adian	Im- ported		Can- adian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	
METAL MINING						
Alluvial Gold Mines.....	Quantity	1	7			
	\$	10	540			
Auriferous Quartz Mines.....	Quantity	9,929	11,370	608		233
	\$	84,986	100,578	10,667		3,362
Copper-Gold-Silver Mines.....	Quantity	1,824				50
	\$	14,157				424
Silver-Cobalt Mines.....	Quantity		883	317		
	\$		12,445	4,610		
Silver-Lead-Zinc Mines.....	Quantity	16,921	8			
	\$	71,229	1,892			
Nickel-Copper Mines.....	Quantity	16	1,436	353		
	\$	165	8,004	5,339		
Miscellaneous Metal Mines.....	Quantity					
Non-Ferrous Smelting and Refining.....	Quantity	4,315	16,120	84		1,783
(See footnote)	\$	23,550	88,448	957		16,528
Total.....	Quantity	33,006	29,824	1,362		2,066
	\$	194,097	211,907	21,573		20,314
NON-METAL MINING, INCLUDING FUELS						
<i>Fuels</i>						
Coal.....	Quantity	582,624		107,369		
	\$	1,842,097		102,047		
Natural Gas.....	Quantity	277	2,082	400	108	2
	\$	805	3,921	4,763	450	36
Petroleum.....	Quantity		50		57	
	\$		422		285	
Total.....	Quantity	582,901	2,132	400	107,534	2
	\$	1,842,902	4,343	4,763	102,732	36
<i>Other Non-Metal Mining</i>						
Abrasives—natural.....	Quantity	144				
	\$	1,010				
Asbestos.....	Quantity	14,825	110	6,159		126
	\$	99,348	945	41,448		1,502
Feldspar and Quartz.....	Quantity	170				1
	\$	982	6,099			16
Gypsum.....	Quantity	4,062				148
	\$	20,727				1,212
Iron Oxides.....	Quantity	36		16		
	\$	250		246		
Mica.....	Quantity					
	\$					
Salt.....	Quantity	2,420	38,096			
	\$	10,827	156,940			
Talc and Soapstone.....	Quantity	25	49	39		
	\$	300	317	432		
Miscellaneous.....	Quantity	6,780	259		10,732	
	\$	44,077	1,152		32,340	
Total.....	Quantity	28,462	39,413	6,214	10,732	275
	\$	177,521	165,453	42,126	32,340	2,730
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement.....	Quantity	48,905	46,955			
	\$	236,947	229,399			
Clay Products.....	Quantity	6,887	33,943		271	115
	\$	39,891	200,269		1,068	1,099
Lime.....	Quantity	21,593	27,795	110	34	10,096
	\$	120,885	126,097	558	113	64,286
Sand and Gravel.....	Quantity	10,454	694	2		9
	\$	51,484	4,508	35		88
Stone.....	Quantity	1,690	3,884	512	21	25
	\$	11,649	24,551	3,468	105	308
Total.....	Quantity	89,529	113,271	624	326	10,245
	\$	460,856	584,824	4,061	1,286	65,781
Canada.....	Quantity	733,898	184,640	8,600	118,592	12,588
	\$	2,675,376	966,527	72,523	136,408	88,861

NOTE—Fuel and electricity used for metallurgical purposes and not included above consisted of bituminous coal from Canadian mines 244,761 tons, value \$1,657,991; imported bituminous, 109,006 tons at \$578,272; coke, 129,605 tons at \$1,165,432; fuel oil, 7,218,294 gallons at \$327,775; wood, 5,489 cords at \$28,963; manufactured gas, 45,886 M cu. ft., at \$4,998; electricity, purchased 380,331,833 K.W.H. at \$1,232,104 and other fuel valued at \$22,079. Total value \$5,017,614.

Industry in Canada, by Kinds and Industries, 1933

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
7,324	830	101,200	2,915						11,301,002
3,134	317	10,600	20,564					35,165	
244,767	9,536	1,828,112	54,405	21			317,550,168		15,758,089
67,325	2,489	189,453	209,011	348		66	2,661,852	3,330,137	
3,170	857	394,568	1,192				68,641,303		25,757,872
990	204	19,211	2,747			15,485	351,407	404,625	
1,358		7,326	410				5,487,755		
459		1,200	2,472			11,360	51,019	83,565	
22,861	369	169,838	60				39,040,970		3,396,440
23,295	135	23,602	263				163,861	234,277	
2,290	1,355	51,449	372				43,546,440		
630	276	4,725	500				133,473	152,984	
295			1,000				3,000		
78			160	127,372			100	1,178	
29,541	4,395	3,078,478	657	14,011	79	5,008	833,473,571		15,442,203
5,553	948	114,325			69		2,522,078	2,792,322	
311,606	17,342	5,630,971	59,704	127,393	79		1,307,743,207		71,655,606
101,564	4,369	363,116	237,086	14,359	69	32,069	5,883,790	7,084,253	
45,216	4,112	5,731					89,231,995		45,068,623
11,869	852	844					1,256,923	3,214,632	
22,192	3,000	1,130			79,332		10,996		
5,573	317	80			37,827		22,422	53,994	
2,562	300	35,630	82		1,645,033		1,448,496		1,859,830
618	36	1,374	246		113,084		20,213	136,278	
69,970	7,412	48,491	82		1,724,365		90,691,487		46,988,453
18,060	1,205	2,298	246		150,911		1,277,358	3,404,904	
100								1,034	
24									
18,289	3,195	6,402					53,024,096		
3,201	490	732					623,661	771,327	
13,152	271	65,026			342		286,762		438,300
3,138	59	5,946			1,300		8,691	26,327	
44,697	224	79,716	918		10,763	96	2,725,415		781,190
11,243	49	3,983	2,891		4,305		47,108	91,518	
	65		783				71,774		
	12		3,094				2,153	5,755	
			80					80	
			80				685,840		5,968,524
200	127	89,369	1,258				7,916	191,373	
62	37	8,043	7,545				1,441,864	26,424	
2,675			113				24,388		1,375,426
535			452				62,875	176,512	
43,996	270	1,500,104	459				713		
7,076	59	89,689	1,406						
123,109	4,152	1,740,617	3,611	342	10,763		58,298,626		8,563,440
25,279	706	108,593	15,471	1,300	4,306	96	714,630	1,290,350	
39,178	581	37					48,160,143		
6,793	102	5					508,841	982,087	
19,424	130	12,622	14,408		173,485		3,749,105		59,578
4,451	27	1,320	52,529		11,232		65,455	377,321	
4,120	35	324,065	35,677	1,300			5,343,821		857,799
889	7	9,865	110,601	780		88	38,956	473,125	
81,157	151	265,770				98	1,990,397		150,000
17,923	28	10,024				39	44,374	129,410	
133,669	620	61,912	2,294			907	12,470,882		209,380
30,272	97	5,121	6,030			437	201,416	283,454	
277,548	1,517	664,436	52,378	1,300	173,583		71,714,348		1,276,757
60,328	261	26,335	169,160	780	11,271	1,432	859,022	2,245,397	
782,233	30,423	8,078,515	115,776	129,635	1,908,790		1,528,447,668		128,424,256
205,231	6,541	500,142	421,963	16,439	166,556	33,537	8,734,800	14,024,904	

Table 26.—Fuel and Electricity Used in the Mineral

Province	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Can- adian	Im- ported		Can- adian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	Tons
Nova Scotia..... Quantity	355,701	33				1,140
\$	1,244,167	259				7,138
New Brunswick..... Quantity	6,903	44				
\$	29,032	403				
Quebec..... Quantity	136,665	20,132	6,207	3		1,521
\$	772,945	132,360	46,193	45		16,781
Ontario..... Quantity	8,779	248,559	1,145	1,276		9,049
\$	50,523	1,313,906	16,435	10,158		65,491
Manitoba..... Quantity	21,615	682		357		108
\$	166,368	7,287		2,678		1,344
Saskatchewan..... Quantity	822		1,029	32,070		
\$	6,263		7,553	38,492		
Alberta..... Quantity	117,239	459		80,760		
\$	329,531	2,778		79,079		
British Columbia..... Quantity	250,771	10	19	204		1,859
\$	1,015,568	606	474	1,010		19,729
Yukon..... Quantity	22					
\$	1,695					
Canada..... Quantity	898,517	269,919	8,406	114,670		13,677
\$	3,616,982	1,457,599	70,655	131,462		110,483

Table 27.—Fuel and Electricity Used in the Mineral

Province	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Can- adian	Im- ported		Can- adian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	Tons
Nova Scotia..... Quantity	361,860	5				829
\$	1,284,407	80				4,804
New Brunswick..... Quantity	5,838	7				
\$	24,029	122				
Quebec..... Quantity	82,234	29,732	7,045			4,735
\$	450,803	164,544	49,929			35,557
Ontario..... Quantity	19,645	154,422	1,476			6,799
\$	131,156	792,653	21,804			46,449
Manitoba..... Quantity	2,710	388		34		20
\$	20,219	4,310		113		256
Saskatchewan..... Quantity	2,162			42,968		
\$	15,622			66,090		
Alberta..... Quantity	115,580			75,539		
\$	301,800			70,100		
British Columbia..... Quantity	143,817	80	79	21		205
\$	447,259	2,584	790	105		1,795
Yukon..... Quantity	22	6				
\$	78	2,234				
Canada..... Quantity	733,898	184,640	8,600	118,592		12,588
\$	2,675,376	966,527	72,523	136,408		88,861

Industry in Canada, by Provinces, 1932

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
52,217	536	45,313	1,027	35,044			53,819,691		19,732,592
12,509	118	3,316	3,921	2,803			773,643	2,047,874	
8,127	108	42,487	7,874		21,526		848,480		
1,939	24	3,224	32,150		10,262		19,888	96,922	
240,205	12,660	3,623,997	29,997	18,684			513,064,998		71,376,570
54,449	2,983	160,232	122,316	1,941		428	2,932,689	4,243,362	
223,506	12,514	3,370,785	30,103	5,013	43,830		544,717,303		9,046,221
48,342	2,849	196,647	120,933	1,558	22,795	26,340	3,571,078	5,447,055	
65,878	3,601	50,371	9,415				186,549,530		65,945
20,013	973	9,197	35,167				236,976	479,993	
53,334	1,642	874,628					1,377,431		473,883
12,017	383	55,834					31,891	152,433	
24,238	3,505	20,102	840		1,821,521		18,144,037		10,819,163
6,553	697	1,533	3,593		102,610		277,763	804,137	
76,837	2,521	3,892,391	9,973	143,549			439,561,957		74,891,182
25,207	856	206,960	29,471	15,675		2,898	1,771,778	3,090,232	
1,580	510	140,720	3,061						13,041,987
3,229	461	65,302	43,789					114,476	
745,922	37,597	12,060,794	92,290	202,290	1,886,877		1,758,083,427		199,447,543
184,258	9,344	702,245	351,340	21,977	135,667	29,666	8,615,706	16,476,484	

Industry in Canada, by Provinces, 1933

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.		K.W.H.	\$	K.W.H.
53,021	322	47,725	816				65,018,005		14,081,073
13,079	77	5,375	3,066				908,348	2,219,236	
5,713		805	8,404		15,318		943,001		
1,519		40	30,640		7,500		19,643	83,493	
248,358	10,210	1,894,733	47,333	342			247,773,170		7,463,332
57,427	1,676	112,407	166,170	1,300		578	1,913,152	2,953,543	
323,099	10,927	967,988	32,419	1,321	81,410		526,275,310		13,452,791
71,669	2,380	85,799	118,600	1,128	40,213	11,421	3,567,779	4,891,054	
15,655	314	39,545	12,436				151,244,115		118,935
7,320	110	10,374	51,726				139,774	234,202	
43,476	575	1,505,996	3				49,677,889		1,682,604
9,101	148	90,187	14				57,736	238,898	
18,470	3,567	41,398	581		1,812,062		18,378,699		16,807,813
5,168	798	2,223	2,481		118,843		304,121	805,577	
61,156	4,037	3,578,034	12,094	127,372			469,137,479		63,611,708
19,686	1,254	191,972	31,868	14,011		21,495	1,824,247	2,557,066	
13,285	71	2,291	1,690						11,206,000
20,262	98	1,765	17,398					41,835	
782,233	30,423	8,078,515	115,776	129,035	1,908,790		1,528,447,668		128,424,256
203,231	6,541	500,142	421,963	16,439	166,556	33,537	8,734,800	14,024,904	

Table 28.—Power Employed in the Mineral Industry in Canada, by Provinces, 1933, with Comparative Totals for 1932

Province	Steam engines and turbines	Diesel engines	Gasoline gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia.....No.	93	6	56	1	156	670	826	100	146
H.P.	58,189	764	2,329	95	61,377	50,214	111,591	6,175	36,685
New Brunswick.....No.	34	1	33	.....	68	73	141	1	33
H.P.	2,262	35	556	.....	2,853	853	3,706	30	1,553
Quebec.....No.	63	29	93	15	200	3,145	3,345	178	117
H.P.	3,008	4,271	3,034	52,230	62,543	139,229	201,772	3,214	10,785
Ontario.....No.	157	24	318	18	517	6,110	6,627	847	209
H.P.	16,943	2,646	10,640	8,536	38,765	266,252	305,017	19,094	27,463
Manitoba.....No.	38	6	51	.....	95	1,084	1,179	10	28
H.P.	5,748	546	2,115	.....	8,409	47,273	55,682	119	3,366
Saskatchewan.....No.	52	5	22	.....	79	353	432	124	25
H.P.	4,711	1,050	682	.....	6,443	14,416	20,859	1,492	3,400
Alberta.....No.	205	.....	99	1	306	887	1,192	374	234
H.P.	31,982	.....	2,380	15	34,377	32,852	67,229	10,997	26,139
British Columbia.....No.	163	69	75	70	377	2,595	2,972	800	217
H.P.	37,637	7,563	1,559	44,552	91,311	148,089	239,400	25,441	41,047
Yukon.....No.	12	10	9	2	35	.....	33	141	13
H.P.	284	755	199	10,000	11,268	.....	11,268	6,595	425
Canada, 1933.....No.	817	150	756	107	1,830	14,917	16,747	2,575	1,022
H.P.	160,764	17,660	23,494	115,428	317,346	699,178	1,016,524	73,157	150,863
Canada, 1932.....No.	809	670	.....	83	1,562	13,936	15,498	2,392	992
H.P.	152,422	31,996	.....	102,742	287,160	636,607	923,767	95,946	147,311

NOTE.—Includes stand-by equipment.

Table 29.—Power Employed in the Mineral Industry in Canada, by Industries, 1933, with Comparative Totals for 1932

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold									
Mines.....No.	19	5	14	7	46	.....	45	113	17
H.P.	634	62	195	10,025	10,916	.....	10,916	6,187	685
Auriferous Quartz									
Mines.....No.	71	72	115	27	285	2,811	3,096	298	145
H.P.	4,227	10,385	4,304	10,264	29,180	100,720	129,906	8,030	11,365
Copper-Gold-Silver									
Mines.....No.	21	2	24	11	58	1,483	1,541	135	14
H.P.	5,622	48	1,695	9,909	17,274	67,586	84,860	6,862	3,249
Silver-Cobalt									
Mines.....No.	3	.....	.....	.....	5	35	38	.....	8
H.P.	235	.....	.....	.....	236	1,400	1,635	.....	575
Silver-Lead-Zinc									
Mines.....No.	20	26	25	4	75	239	314	112	24
H.P.	7,250	2,811	569	564	11,194	10,446	21,640	2,037	3,562
Nickel-Copper									
Mines.....No.	.....	.....	2	1	5	402	405	.....	1
H.P.	.....	.....	55	365	420	28,846	29,266	.....	60
Miscellaneous Metal									
Mines.....No.	.....	.....	1	.....	1	1	2	.....	2
H.P.	.....	.....	12	.....	12	100	112	.....	100
Non-ferrous Smelting and Refining.....No.	32	.....	11	21	64	4,265	4,329	832	48
H.P.	16,542	.....	348	65,160	82,050	232,021	314,071	16,556	25,459
Total.....No.	166	105	192	71	534	9,236	9,770	1,490	259
H.P.	34,510	13,306	7,178	96,287	151,281	441,119	592,400	39,672	45,053
NON-METAL MINING INCLUDING FUELS—									
Fuels									
Coal.....No.	409	.....	85	2	499	1,546	2,045	550	453
H.P.	109,274	.....	1,112	12,000	122,386	78,647	201,033	20,426	80,948
Natural Gas.....No.	16	.....	164	.....	180	25	205	15	11
H.P.	565	.....	3,715	.....	4,280	686	4,966	203	560
Petroleum.....No.	24	.....	46	1	71	65	136	32	66
H.P.	1,681	.....	1,583	15	3,279	545	3,824	736	5,040
Total.....No.	449	.....	298	3	750	1,636	2,386	597	530
H.P.	111,520	.....	6,410	12,015	129,945	79,878	209,823	21,365	86,548

Table 29.—Power Employed in the Mineral Industry in Canada, by Industries, 1933, with Comparative Totals for 1932—Concluded

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
NON-METAL MINING, INCLUDING FUELS— <i>Conc. Other Non-Metal Mining</i>									
Abrasive—natural No. H.P.	1 80		2 50		3 130		3 130		1 100
Asbestos..... No. H.P.	6 410		1 2		7 412	678 40,858	655 41,276		7 1,100
Feldspar and Quartz..... No. H.P.	6 525	4 575	5 170		15 1,270	22 552	37 1,552	42 352	11 680
Gypsum..... No. H.P.	13 1,313	3 416	47 2,242		63 3,971	206 5,979	272 9,350	25 740	8 840
Iron Oxides..... No. H.P.						5 93	5 93		1 15
Mica..... No. H.P.				1 145	1 145	1 7	2 152	3 115	1 50
Salt..... No. H.P.	10 1,780	3 355	1 12		14 2,147	35 476	49 2,623	140 1,613	6 2,730
Talc and Soap-stone..... No. H.P.			4 40		4 40	24 793	28 833		1 80
†Miscellaneous..... No. H.P.	5 647	3 825	6 84	2 200	16 1,756	54 2,062	70 3,818	75 863	12 801
Total..... No. H.P.	41 4,755	13 2,171	66 2,690	3 345	123 9,871	1,028 50,850	1,151 60,721	289 3,713	48 6,396
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement..... No. H.P.	4 613	1 360	24 955	9 5,336	38 7,264	1,286 75,600	1,324 82,864	119 6,882	11 427
Clay Products..... No. H.P.	58 5,082	10 460	37 897		105 6,439	485 16,208	590 22,647	12 128	79 7,199
Lime..... No. H.P.	10 425	2 129	11 457	1 50	24 1,061	263 5,324	287 6,355	40 571	24 1,590
Sand and Gravel..... No. H.P.	14 574		51 1,894	8 260	73 2,728	201 6,960	274 9,688	2 2	5 555
Stone..... No. H.P.	75 3,285	19 1,234	77 3,103	12 1,135	183 8,757	782 23,239	965 31,996	26 781	64 3,093
Total..... No. H.P.	161 9,579	32 2,183	290 7,306	30 6,781	423 26,249	3,017 127,331	3,440 153,580	199 8,407	185 12,864
Grand total, 1933..... No. H.P.	817 160,764	150 17,669	756 23,494	107 115,428	1,830 317,346	14,917 699,178	16,747 1,016,524	2,575 73,157	1,022 150,863
Grand total, 1932..... No. H.P.	809 152,422	670 31,996		83 102,742	1,562 287,166	13,936 636,697	15,498 923,767	2,392 95,946	992 147,311

†Includes data for peat.

Table 30.—Accidents in the Mining Industry in Canada, by Provinces*, during 1933

Cause of accident	Nova Scotia		New Brunswick		Quebec		Ontario		Saskatchewan		Alberta		British Columbia		Canada	
	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal
UNDERGROUND—																
Falls of roof or face.....	4	278		71	1	40	5	162	3	68	2	60	6	249	21	923
Mine cars and locomotives.....	4	155		32		24	1	48	1	22	1	32	1	83	8	396
Gas and dust explosions.....	2			2								4		5	2	11
Explosives.....		3		4	1	6	2	8				1	2	4	5	26
Electricity.....	1								2			9		1	1	12
Miscellaneous.....	1	234		70	4	99	13	883		102		37	4	584	22	2,069
Total.....	12	670		179	6	169	21	1,101	4	194	3	143	13	926	59	3,382
SURFACE—																
Haulage and cars.....		21		12	1	27		15		29	2	5		7	3	116
Machinery.....		20		1		48		25				7		12		113
Miscellaneous.....		72		16	1	105	4	372		44	1	14	1	116	7	739
Total.....		113		29	2	180	4	412		73	3	26	1	135	10	965
Grand Total.....	12	783		208	8	349	25	1,513	4	267	6	169	14	1,061	69	4,350

* Data for Manitoba not available.

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

(With tables showing the production of gold)

General Review

CANADA

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is named “The Auriferous Quartz Mining Industry” and in which industry the gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian gold mining industry.

Historical.—The early history (1850-1895) of gold production in Canada is largely confined to the placer operations of the pioneer prospector in British Columbia and it was from this source that most of the metal was derived until the discovery, in 1896, of the extremely rich gravels of the Klondike river in the Yukon Territory; between 1898 and 1905 gold to the value of more than \$100,000,000 (4,838,000 fine ounces) is stated to have been obtained from the placers of the Bonanza, Eldorado, Hunker, Dominion and Sulphur Creeks. Almost coincident with this western activity was witnessed the Lake of the Woods discoveries in Ontario and renewed activity on the Nova Scotia quartz veins. The past fifteen to twenty years, although witnessing the decline of the alluvial gold industry, have given to the nation the highly productive auriferous quartz mines of the Porcupine and Kirkland Lake camps in Ontario and of the Portland Canal and Bridge River districts in British Columbia. The base metal mining industries are now contributing important and increasing quantities of gold to Canada’s total production. This has been mostly highly reflected in the growing gold production originating in the recent expansion in copper-nickel and copper-gold mining industries; the increase from the latter industry is strikingly exemplified in the recovery of this metal as the result of extensive mining and metallurgical developments at the Noranda copper mine in the province of Quebec.

Sources.—The great part of the gold of Canada comes from the Canadian shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of the MacKenzie River. The area of the shield is roughly 1,825,000 square miles, almost half of Canada—the precambrian shield is not only our present greatest reservoir of the precious metal, but in all probabilities the most fruitful region for discovery of new deposits.

Production of gold during 1933 from all sources in Canada amounted to 2,949,309 fine ounces valued at \$60,967,626 as compared with an output of 3,044,387 fine ounces worth \$62,933,063 in 1932, gold being valued for both years at the standard price of \$20·671834 per oz.

The source of Canadian production of fine gold by percentages in 1933 was:—in alluvial gold 2·0 per cent, in crude gold bullion 79·8 per cent, in base bullion (from silver-lead ores, etc.) 0·7 per cent, in blister copper 14·2 per cent and in ores, matte, slags, etc., exported, 3·3 per cent.

Seven provinces and Yukon Territory produced gold in 1933 as follows: Nova Scotia, 1,382 fine ounces; Quebec, 382,886 fine ounces; Ontario, 2,155,519 fine ounces; Manitoba, 125,310 fine ounces; Saskatchewan, 5,400 fine ounces; Alberta, 324 fine ounces; British Columbia, 238,995 fine ounces; and Yukon, 39,493 fine ounces.

Importance of the Industry and Recent Gold Legislation.—Practically all of Canada's gold bullion is shipped by the mines to the Royal Canadian Mint at Ottawa. Up until April 19th, 1933, Canada shipped her refined gold to New York accepting payment in United States funds at the coinage value, but after April 19th, on which date the United States went off the gold standard, this gold was shipped to London. While it was the practice to ship gold to New York the mining companies were paid a premium on the net value of their gold at a rate equivalent to the exchange premium in United States funds on the date of deposit of the gold at the Mint. After April 19th, 1933, the Mint paid the producer the standard rate per fine ounce less charges for melting, assaying and refining, and when the gold was sold in a foreign market the difference between the standard rate and the net amount realized, was returned to the producer or shipper. Using the exchange rate until April 19th, 1933, which Canada paid for United States dollars, and taking for the remainder of the year the average price for gold in the London market and transposing it to Canadian funds, the average price for gold during the whole year was \$28.60 per fine ounce. Or, in other words, the value of the 1933 Canadian production of gold amounted to \$84,350,237 in Canadian funds.

The more outstanding events associated with the recent rise in price of gold include the suspension of specie payments by Great Britain on September 21, 1931; the direct control and licensing of Canadian gold exports by the Canadian government; the purchase by the Canadian government of all new gold bullion produced in the Dominion with the payment to the miner of equalization exchange; the departure of the United States from the gold standard on April 19, 1933, and the announcement of January 31, 1934, by President Roosevelt that thereafter the United States Treasury would purchase gold from any quarter at not less than \$35 per fine ounce and would be empowered by United States Congress to offer, if necessary, up to \$41.34 an ounce. The weight of the new United States gold dollar is 15 5/21 grains, nine-tenths fine, as compared with the former gold dollar of 25.8 grains, nine-tenths fine. The new dollar contains 1/35 of an ounce of gold, or in other words, the ounce of fine gold is equivalent to \$35.

The Department of Mines, Ottawa, reports that some time will elapse before it will be possible to gauge the full significance of the high gold price in relation to the possibilities for the development of low grade deposits. At present only a few enterprises are operating entirely on low grade ore, but it is reasonable to assume that the number of low grade gold deposits discovered and undiscovered far exceeds the number of medium or high grade deposits, and that eventually many of these will prove worthy of development. Established producers are actively developing low grade sections of their ore bodies and, in addition, there are several base metal deposits, carrying appreciable values in gold, that are presently inactive because of the comparatively low prices of lead, zinc and copper.

In the Budget Speech of April 18, 1934, the Minister of Finance announced a new tax on gold. Attention was drawn to the unusually prosperous condition of the gold mining industry, due largely to the rise in the price of gold from \$20.67 per ounce, the prevailing rate obtainable under old gold standard conditions, to a figure affording a return of about \$35.00 per ounce. This increase in price, it was pointed out, finds its origin in the chaotic conditions of world currencies, the revaluation of gold by certain countries, and the depreciation of our dollar in the foreign exchanges. The gains thus accruing to the industry, which result from national and international monetary policies, provide the basis for this newly imposed tax.

The Canadian mining industry recorded in 1933 its eleventh consecutive annual increase in the value of gold produced. Since 1931 the value of the Dominion's gold output has retained a premier position in the mining industry, representing 38.1 per cent of the total value of Canadian mineral production in 1933. The value of \$84,350,237, in Canadian funds, for the 1933 gold output is the highest ever recorded and not only reflects the expansion in gold mining activities during recent years but emphasizes the relationship and importance of this great industry to the economic well-being of the nation. The discovery and development of our more important gold deposits in Canada have not only contributed directly to the wealth of the Dominion but have assisted materially in colonization and the development of water power and other natural resources. The auriferous quartz mining industry provided employment in 1933 for 12,823 persons, disbursed \$20,536,012 in salaries and wages, consumed \$3,330,137 in fuel and electricity, employed \$158,599,931 in capital and reported net sales at \$69,151,535.

Table 31.—Production of New Gold in Canada, by Provinces and Sources, 1932 and 1933

(Gold at \$20·671834 per fine ounce)

	1932		1933	
	Fine ounces	Value	Fine ounces	Value
		\$		\$
NOVA SCOTIA—				
In gold bullion.....	964	19,928	1,382	28,568
Exchange equalization.....		2,706		10,957
QUEBEC—				
In blister copper, in ores shipped and in gold bullion.....	401,105	8,291,576	382,886	7,914,956
Exchange equalization.....		1,125,996		3,035,583
ONTARIO—				
*Porcupine area—In gold bullion.....	1,036,295	21,422,118	1,046,091	21,624,620
*Kirkland Lake—In gold bullion.....	1,143,181	23,631,648	1,007,036	20,817,281
Miscellaneous, including Northwestern Ontario and Sudbury area.....	100,629	2,080,186	102,392	2,116,630
Total.....	2,280,105	47,133,952	2,155,519	44,558,531
Exchange equalization.....		6,400,791		17,089,312
MANITOBA—				
In gold bullion, ores shipped and in blister copper.....	122,507	2,532,444	125,310	2,590,388
Exchange equalization.....		343,906		993,478
SASKATCHEWAN—				
In ores shipped to Canadian smelters and crude gold to Royal Canadian Mint.....	11	227	5,400	111,628
Exchange equalization.....		31		42,812
ALBERTA—				
In alluvial gold.....	83	1,716	324	6,698
Exchange equalization.....		233		2,569
BRITISH COLUMBIA—				
In alluvial gold.....	16,320	337,364	19,142	395,700
In gold bullion.....	57,846	1,195,783	122,293	2,528,021
In blister copper.....	19,013	393,034	8,667	179,163
In base bullion and in matte and ores exported.....	105,825	2,187,597	88,893	1,837,581
Total.....	199,004	4,113,778	238,995	4,940,465
Exchange equalization.....		558,651		1,894,792
YUKON—				
In alluvial gold.....	40,373	834,584	39,174	809,798
In ores exported.....	235	4,858	319	6,594
Total.....	40,608	839,442	39,493	816,392
Exchange equalization.....		113,996		313,108
Total for Canada.....	3,044,387	62,933,063	2,949,309	60,967,626
Estimated exchange equalization on gold produced.....		8,546,310		23,382,611
Grand Total Value, including exchange equalization.....		71,479,373		84,350,237

*Includes small amounts of gold contained in slags, etc.

Table 32.—Imports into Canada and Exports of Gold, 1932 and 1933

	1932	1933
	\$	\$
IMPORTS—		
Coins and bullion—		
Coins, British, Canadian and foreign gold coins.....	854,908	810,562
Gold bullion in bars, blocks, ingots, drops, sheets or plates, unmanufactured.....	264,863	35,316
Total.....	1,119,771	845,878
Gold, other—		
Bullion or gold fringe.....	6,371	4,554
Manufactures of gold and silver—		
Leaf.....	63,203	52,790
Sweepings.....	70	4,119
Manufactures, n.o.p.....	19,189	17,729
Electro-plated ware.....	337,721	260,176
Medals of gold, silver or copper and other metallic articles, actually bestowed as trophies or prizes, and received and accepted as honorary distinctions, and cups or other metallic prizes won in bona fide competitions.....	19,788	.....
Gold, unmanufactured, for commercial purposes, from April 1, 1933.....	.....	168,382
Total.....	446,342	507,750

Table 32.—Imports into Canada and Exports of Gold, 1932 and 1933—Concluded

	1932	1933
	\$	\$
Exports—		
Coin and bullion—		
Gold coin—		
Canadian.....	500	10
Foreign.....	9,424,691	5,963,887
Gold bullion—		
Canadian.....	51,395,700	56,002,261
Foreign.....	4,520	877
Total—Canadian	51,396,200	56,002,271
Foreign	9,429,211	5,964,764
Total coin and fine gold bullion	60,825,411	61,967,035
Gold-bearing quartz, dust, nuggets and crude bullion obtained direct from mining operations....	3,925,729	2,299,650
Jewellers' sweepings (gold, silver and platinum).....	290,095	502,506
Total	4,215,824	2,802,156

Table 33.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds

	1931	1932	1933
	\$	\$	\$
January.....	20.71	24.24	23.64
February.....	20.67	23.67	24.74
March.....	20.67	23.11	24.78
April.....	20.68	22.98	25.33
May.....	20.68	23.38	27.75
June.....	20.73	23.83	28.24
July.....	20.74	23.73	30.58
August.....	20.73	23.61	30.09
September.....	21.55	22.88	31.79
October.....	23.22	22.65	31.48
November.....	23.22	23.73	32.68
December.....	25.01	23.85	32.14
Yearly average.....	21.55	23.47	28.60

Table 34.—Receipts at the Royal Canadian Mint, Ottawa, Canada, by Sources, 1932 and 1933

Source	1932			1933		
	Gross weight	Precious metal content		Gross weight	Precious metal content	
		Fine gold	Fine silver		Fine gold	Fine silver
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
Nova Scotia.....	1,144.75	963.832	47.19	1,579.18	1,382.270	103.87
Quebec.....	482,354.34	471,197.715	5,359.63	425,155.29	414,476.545	6,093.67
Ontario.....	2,865,270.73	2,248,106.008	300,927.10	2,718,859.36	2,115,260.420	299,700.80
Manitoba.....	56,449.14	34,469.810	4,809.00	53,952.77	35,731.596	5,945.73
Saskatchewan.....	3.90	3.085	0.59	1,234.60	37.713	3.55
Alberta.....	124.02	92.490	8.60	433.46	323.913	31.76
British Columbia including Dominion of						
Canada Assay Office, Vancouver.....	84,293.28	62,408.419	13,622.75	177,471.66	136,176.094	25,052.25
Yukon.....	321.41	254.945	61.97	27,661.07	21,566.050	4,858.23
Jewellery and scrap, various sources.....	30,293.07	12,015.167	3,831.25	161,193.66	83,690.046	20,844.57
Foreign.....	13.32	9.604	2.52	13.54	11.849	0.73
Mutilated coin.....				15.50	14.000	0.11
Total	3,520,267.96	2,829,521.075	328,670.60	3,567,570.09	2,808,670.496	362,635.27

Table 35.—Production of Gold in Canada, 1924-1933

Year	Fine ounces*	Value	Year	Fine ounces*	Value
		\$			\$
1924.....	1,525,382	31,532,443	1929.....	1,928,308	39,861,663
1925.....	1,735,735	35,880,826	1930.....	2,102,068	43,453,601
1926.....	1,754,228	36,263,110	†1931.....	2,693,892	55,687,688
1927.....	1,852,785	38,300,464	†1932.....	3,044,387	62,933,063
1928.....	1,890,592	39,082,005	†1933.....	2,949,309	60,967,626

Note.—For years 1858 to 1923, see previous reports.

*Calculated from the value \$1=0.048375 ounces.

†Value of gold in Canadian dollars, 1931—\$58,093,396.

†Value of gold in Canadian dollars, 1932—\$71,479,373.

†Value of gold in Canadian dollars, 1933—\$84,350,237.

Table 36.—Quantity and Value of Gold produced in Canada, by Provinces, 1924-1933

(For the years 1862 to 1923, see Mineral Production of Canada, 1928)

Year	Nova Scotia			Quebec		
	Fine oz.	Statutory value \$	Value in Canadian dollars \$	Fine oz.	Statutory value \$	Value in Canadian dollars \$
1924.....	1,047	21,643	.....	883	18,253	.....
1925.....	1,626	33,612	.....	1,602	33,116	.....
1926.....	1,678	34,687	.....	3,680	76,072	.....
1927.....	3,151	65,137	.....	8,331	172,217	.....
1928.....	1,290	26,667	.....	60,006	1,240,434	.....
1929.....	2,687	55,545	.....	90,798	1,876,961	.....
1930.....	1,272	26,295	.....	141,747	2,930,170	.....
1931.....	460	9,509	9,920	300,075	6,203,101	6,471,075
1932.....	964	19,928	22,634	401,105	8,291,576	9,417,572
1933.....	1,382	28,568	39,525	382,886	7,914,956	10,950,539

Year	Ontario			Manitoba		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1924.....	1,241,728	25,668,795	.....	1,180	24,393	.....
1925.....	1,461,039	30,202,357	.....	4,424	91,452	.....
1926.....	1,497,215	30,950,180	.....	188	3,886	.....
1927.....	1,627,050	33,634,108	.....	182	3,762	.....
1928.....	1,578,434	32,629,126	.....	19,813	409,571	.....
1929.....	1,622,267	33,535,234	.....	22,455	464,186	.....
1930.....	1,736,012	35,886,552	.....	23,189	479,359	.....
1931.....	2,085,814	43,117,000	44,980,280	102,969	2,128,558	2,220,512
1932.....	2,280,105	47,133,952	53,534,743	122,507	2,532,444	2,876,350
1933.....	2,155,519	44,558,351	61,647,843	125,310	2,590,388	3,583,866

Year	Saskatchewan			Alberta		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1924.....
1925.....
1926.....
1927.....	42	868	.....
1928.....	68	1,406	.....
1929.....	5	103	.....
1930.....
1931.....	11	227	258	195	4,081	4,205
1932.....	83	1,716	1,949
1933.....	5,400	111,628	154,440	324	6,698	9,267

Year	British Columbia			Yukon		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1924.....	245,719	5,079,462	.....	34,825	719,897	.....
1925.....	219,227	4,531,824	.....	47,817	988,465	.....
1926.....	225,866	4,669,055	.....	25,601	529,220	.....
1927.....	183,094	3,784,889	.....	30,935	639,483	.....
1928.....	196,617	4,064,434	.....	34,364	710,367	.....
1929.....	154,204	3,187,680	.....	35,892	741,954	.....
1930.....	164,331	3,397,023	.....	35,517	734,202	.....
1931.....	160,069	3,308,920	3,451,865	44,310	915,969	955,539
1932.....	199,004	4,113,778	4,672,429	40,008	839,442	953,438
1933.....	238,995	4,940,465	6,835,257	39,493	816,392	1,129,500

Table 37.—Total Gold Production in Ontario*

Year	Total production	Porcupine belt		Kirkland Lake belt	
	\$	\$	per cent	\$	per cent
1866-1891.....	†190,258				
1892-1909.....	‡2,509,492				
1910.....	68,498	35,539	51.8		
1911.....	42,637	15,437	36.2		
1912.....	2,114,086	1,730,628	81.8		
1913.....	4,558,518	4,294,113	94.1	86,316	1.9
1914.....	5,544,979	5,206,006	93.8	114,154	2.0
1915.....	8,501,391	7,462,111	88.6	551,069	6.5
1916.....	10,339,259	9,391,408	90.8	702,761	6.8
1917.....	8,698,735	8,229,744	94.5	404,346	4.6
1918.....	8,502,480	7,767,907	91.4	632,007	7.4
1919.....	10,451,709	9,941,803	95.1	486,809	4.7
1920.....	11,686,043	10,597,572	90.7	1,033,478	8.8
1921.....	14,692,357	13,103,526	89.5	1,524,851	10.4
1922.....	20,579,569	18,374,658	89.3	2,159,581	10.5
1923.....	20,136,287	17,313,115	85.9	2,719,939	13.5
1924.....	25,669,303	22,135,534	86.2	3,446,632	13.4
1925.....	30,206,432	24,733,120	81.8	5,385,256	17.8
1926.....	30,950,753	23,680,670	76.5	7,174,083	23.2
1927.....	33,627,040	23,851,857	70.9	9,674,114	28.7
1928.....	32,629,111	20,246,319	62.0	12,233,524	37.5
1929.....	33,535,226	19,281,286	57.6	14,046,596	41.8
1930.....	35,886,558	17,758,842	49.6	17,172,770	47.9
1931.....	43,117,615	19,891,521	46.2	21,734,729	50.4
1932.....	47,284,621	21,422,117	45.2	23,782,313	50.3
1933.....	44,558,531	21,624,620	45.9	20,817,281	44.3
Total to end of 1933.....	486,081,488	328,089,453	73.1	145,882,609	32.05

*Supplied by Ontario Department of Mines.

†Estimated.

‡Maximum yearly output was \$424,568 in 1899.

Table 38.—Gold held by the Canadian Minister of Finance, Calendar Years, 1919-1933†

Calendar Year	Gold Re- serve Held on Postal Savings Bank Deposits (a)	Gold Held for Redemp- tion of Dominion Notes	Total Gold Held by Minister of Finance
	\$	\$	\$
1919.....	4,909,675	118,489,692	123,399,367
1920.....	4,067,897	98,751,773	102,819,670
1921.....	3,666,009	84,568,064	88,234,073
1922.....	3,293,287	89,939,108	93,232,395
1923.....	3,154,358	120,651,627	123,805,985
1924.....	3,308,575	107,257,428	110,566,003
1925.....	3,241,490	119,744,819	122,986,309
1926.....	3,162,930	109,369,550	112,532,480
1927.....	3,083,440	107,417,631	110,501,071
1928.....	2,994,001	89,218,454	92,212,455
1929.....	2,709,169	59,345,233	62,054,402
1930.....	2,483,959	79,000,297	81,484,256
1931.....	2,405,030	74,209,510	76,614,540
1932.....	2,324,246	66,854,214	69,178,460
1933.....	2,311,866	69,793,861	72,105,727

†Yearly averages.

(a) In the Savings Bank Act (c. 15, R.S.C., 1927) it is provided that the Minister of Finance shall hold 10 per cent gold reserve against postal savings bank deposits.

Table 39.—Composition of Canadian Gold Reserves on December 31, 1923-1933

December 31st	British Coin	U.S. Coin	Canadian Coin	Bullion	Total
	\$	\$	\$	\$	\$
1923.....	27,212,790	41,090,395	3,336,490	46,026,852	117,666,527
1924.....	26,342,019	77,173,105	3,327,125	34,905,387	141,747,636
1925.....	29,894,943	67,135,310	3,315,730	37,512,195	137,858,178
1926.....	32,133,941	72,423,610	3,221,930	23,415,643	131,195,124
1927.....	28,948,085	51,179,390	3,089,010	47,516,079	130,732,564
1928.....	34,163,297	31,018,970	2,931,835	25,202,771	93,316,873
1929.....	32,164,284	10,995,220	2,801,520	17,034,256	62,995,280
1930.....	30,634,058	28,748,085	2,733,150	34,096,809	96,212,102
1931.....	17,736,296	4,270,780	2,732,880	42,220,192	66,960,148
1932.....	17,638,240	4,271,355	2,704,930	48,429,889	73,044,414
1933.....	17,637,435	4,266,835	2,704,880	47,356,454	71,965,604

Table 40.—Comparative Figures of Gold Production, for the World, South Africa, the United States and Canada, 1913-1933

Year	*World's output	†Union of South Africa output	*United States' output	Canada's output
	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1913.....	22,249,596	8,798,713	4,299,784	802,973
1914.....	21,240,416	8,396,068	4,572,976	773,178
1915.....	22,760,788	9,096,411	4,887,604	918,056
1916.....	22,107,669	9,296,964	4,479,057	930,492
1917.....	20,289,546	9,018,389	4,051,440	738,831
1918.....	18,556,920	8,418,379	3,320,784	699,681
1919.....	17,695,037	8,331,651	2,918,628	766,764
1920.....	16,205,029	8,158,455	2,476,166	765,007
1921.....	15,974,962	8,128,710	2,422,006	926,329
1922.....	15,451,945	7,009,858	2,289,235	1,263,364
1923.....	17,790,597	9,149,073	2,426,495	1,233,341
1924.....	19,031,001	9,575,040	2,446,338	1,525,382
1925.....	19,025,942	9,597,592	2,319,920	1,735,735
1926.....	19,349,118	9,954,762	2,238,616	1,754,228
1927.....	19,397,757	10,122,491	2,117,253	1,852,785
1928.....	19,755,622	10,354,264	2,144,720	1,890,592
1929.....	19,500,152	10,412,326	2,056,629	1,928,308
1930.....	20,900,000	10,716,351	2,138,723	2,102,068
1931.....	20,800,000	10,877,777	2,224,729	2,693,892
1932.....	22,400,000	11,558,532	2,269,459	3,044,387
1933.....	22,800,000	11,013,712	2,303,736	2,949,309

*Figures taken from annual report of the Director of the Mint, Washington, from 1913 to 1929. From 1930 figures are supplied by Imperial Institute

†From the Imperial Institute publications.

NOTE.—For complete historical table of Canadian Gold Production, see 1928 Annual Report on Mineral Production of Canada.

Table 41.—World Production of Gold Ore, 1931-1933

(In terms of metal)

(Supplied by Imperial Institute)

Country	1931	1932	1933	Country	1931	1932	1933
	Fine ounces	Fine ounces	Fine ounces		Fine ounces	Fine ounces	Fine ounces
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
United Kingdom.....		6	57	Hungary.....	1,505	2,690	3,099
Anglo-Egyptian Sudan.....	940	700	4,400	Sweden.....	61,632	132,453	288,643
Bechuanaland Protector- ate.....	1,302	2,247	5,332	Belgian Congo.....	214,601	255,271	283,081
Gold Coast.....	261,651	278,782	305,908	Spain.....	(a)		7,716
Kenya.....	3,169	9,052	10,531	Egypt.....		16	
Nigeria.....	699	2,701	17,718	Eritrea.....	225	1,897	(a)
Northern Rhodesia.....	9,364	6,349	2,588	French Equatorial Africa.....	8,729	16,814	25,077
Southern Rhodesia.....	532,111	574,135	642,499	French West Africa.....	33,147	44,656	(a)
Sierra Leone.....	5,700	10,500	14,484	Madagascar.....	8,584	11,338	(a)
South West Africa.....	570	890	956	Mozambique.....	538	2,665	1,705
Swaziland.....		365	630	Mexico.....	623,003	584,198	637,727
Tanganyika Territory.....	12,728	25,687	39,532	United States (b).....	2,224,729	2,269,459	2,803,736
Union of South Africa.....	10,877,777	11,558,532	11,013,712	Costa Rica (g).....	2,667	8,088	2,969
Canada.....	2,693,892	3,044,387	2,949,309	Guatemala.....	13,146	10,332	(a)
Newfoundland.....	10,911	17,661	15,689	Honduras.....	15,835	16,054	17,211
British Guiana.....	10,183	13,926	23,352	Nicaragua (g).....	14,385	14,045	6,681
Federated Malay States.....	27,021	27,159	28,973	Panama.....	(e) 5,500	(g) 3,290	(g) 3,295
Unfederated Malay States.....		289	2,131	Salvador (g).....	13	927	2,691
India.....	330,400	329,600	336,100	Argentina (estimated).....	1,000	1,000	1,000
Sarawak.....	5,900	8,178	18,712	Bolivia.....	26	218	30
Australia.....	595,123	714,135	825,930	Brazil.....	136,252	124,163	120,016
Fiji.....		311	1,842	Chile.....	21,381	38,096	147,052
New Guinea (years ended June 30).....	29,858	63,485	121,913	Colombia.....	194,274	248,249	298,243
New Zealand.....	130,049	166,354	161,755	Dutch Guiana (crude gold).....	4,613	8,964	(a)
Papua.....	5,859	9,904	9,850	Ecuador.....	59,616	56,147	(a)
Uganda.....	71	586	1,200	French Guiana.....	47,486	48,418	(a)
Total.....	15,500,000	16,870,000	16,560,000	Peru.....	80,182	70,700	84,066
				Venezuela.....	71,481	91,534	95,720
FOREIGN COUNTRIES—				China.....	77,329	72,900	(a)
Czechoslovakia.....	5,743	6,544	9,836	Formosa.....	(e) 65,000	65,700	(a)
France.....	66,936	92,110	94,521	French Indo-China.....	225	219	145
Germany.....	4,128	2,205	5,494	Japan.....	394,326	401,784	441,375
Italy.....	2,479	1,842	2,906	Korea.....	303,000	327,000	390,000
Yugoslavia (estimated).....	22,000	15,000	28,000	Netherlands East Indies.....	100,090	77,957	78,829
Roumania.....	88,123	102,591	127,147	Philippine Islands.....	182,008	244,298	325,039
				Turkey.....	220	(a)	(a)
				Manchukuo.....	78,799	(a)	21,640
				Total*.....	5,200,000	5,500,000	6,200,000
				World's Total.....	20,800,000	22,400,000	22,800,000

*Excluding the production of U.S.S.R. (Russia). Owing to the wide divergences in the scattered data published (mainly relative figures) it is not possible to form any reliable estimate for the years under review, but the available information indicates that the production of that country was probably within the following ranges—

1931.....	1,200,000	—	1,700,000	fine ounces
1932.....	1,500,000	—	2,000,000	"
1933.....	2,200,000	—	2,700,000	"

(a) Information not available.

(b) Amount recovered.

(c) Estimated.

(g) Imports into the United States from the country indicated.

The Alluvial Gold Mining Industry

It is very difficult to secure complete information on alluvial mining in Canada since placer fields are mostly remote and except in a few instances are operated by individuals of usually no fixed abode. Dredging and hydraulicking companies operating in the Yukon Territory send annual returns to the Bureau. The Mining Lands Branch, Department of Interior, under whose regulations mining is carried on in this territory, also supply more comprehensive data.

Placer gold was reported in Canada as early as 1823 when the metal was discovered on the Chaudière river, Quebec. Later, in 1855, alluvial gold was found at the mouth of Pend d'Oreille river, B.C., by ex-servants of the Hudson's Bay Company and by 1859 placer miners had penetrated to Cariboo and Quesnel. Later years witnessed many important discoveries of placer gold in both British Columbia and the Yukon, the most outstanding of which was the finding of the sensationally rich Klondike deposits in 1896. At the present time the greater part of the Canadian production of alluvial gold comes from the Yukon Territory and British Columbia; smaller amounts are recovered in Alberta and Quebec.

NOVA SCOTIA

No production of placer gold is reported from this province; however, it is interesting to note that churn test-drilling was reported on the Mullach river, Inverness county, during July, August and September, 1933. The results from these operations were not stated.

QUEBEC

Placer deposits in the Chaudière basin were mined extensively between 1875 and 1885 and sporadically since. The Canadian Geological Survey states that the source of these placers was undoubtedly the quartz veins of the district, none of which, up to the present time, has been found large enough or rich enough for mining.

In 1933 properties were operated in Beauce and Compton counties. Only one operator reported production, this coming from a deposit located at St. Simon Les Mines, Beauce county. Operations in Compton county were confined to the development of auriferous deposits in Ditton township and included shaft sinking, drifting and surface exploration.

ALBERTA

Placer gold was discovered on the North Saskatchewan river in 1859 or 1860 and mining has been carried on, chiefly by hand methods and partly by the use of dredges, at intervals down to the present time. Placer gold also occurs on several other streams in the province. During 1932 recoveries of small quantities of crude alluvial gold were reported by small operators working on the Peace River or its tributaries. The McLeod River Mining Corporation installed a dredge on the McLeod River in 1932 making small shipments of crude gold in that year. The company reported early in 1934 that its dredge was then inactive. Relatively small shipments of crude gold were made from Alberta to the Royal Canadian Mint, Ottawa, in 1933.

BRITISH COLUMBIA

The production of alluvial fine gold in this province increased from 16,320 fine ounces in 1932 to 19,142 in 1933, an increase of 17.3 per cent. The British Columbia Department of Mines states that "The Atlin and Cariboo camps were responsible for most of this increase, and in both these fields the possibilities are for a continued increase in output for some years to come. In a number of other camps, scattered throughout the province, large placer operations are expected to reach production in the 1934 season, and this will possibly be reflected in an increased production in 1934.

"Placer-testing and small-scale operations in the past have not been conclusive in many placer properties, and as better technical control and study is brought to bear on this type of mining, the industry is regaining some of its former importance. . . . Many hundreds of placer prospectors spent the 1933 season in the hills, along the streams and rivers, looking for, and in many instances, earning a grubstake." It is interesting to note that the total value of placer gold produced in British Columbia up to and including 1933 amounted to \$79,634,517. For those interested in placer mining and the opportunities which exist therein in various parts of the province, attention is directed to bulletin No. 1, 1933, "Placer Mining in British Columbia" (25 cents). This book, issued by the British Columbia Department of Mines, Victoria, B.C., contains notes on elementary methods of prospecting and working placer deposits in addition to detailed information respecting the placer possibilities of the various mineral survey districts of the province.

YUKON

Prospecting for placer gold in Yukon Territory was conducted for at least fifteen years prior to the discovery of the Klondike in 1896. The main production of placer gold in Canada has come from this field. Output reached a maximum in 1900 when it exceeded \$22,000,000. The Geological Survey of Canada describes the Klondike district as unglaciated; the gold-bearing gravels are not covered with glacial drift as is generally the case in glaciated districts, and were not disturbed or eroded by over-riding of the ice sheet. Bonanza Creek, one of the most important creeks of Klondike district, proved productive for about 13 miles. The creek flows through a valley flat 300 to 600 feet wide bounded by steep slopes; the valley proved productive for about 13 miles and yielded in the part about mid-length over \$1,000 a running foot of valley. Produc-

tion from placers in the Yukon totalled 39,174 fine ounces in 1933 which represents a decrease of 3 per cent from the output for the preceding year. The value, however, estimated to include equalization exchange, was 18·3 per cent more than in 1932.

The Department of Interior, Ottawa, reported that the major portion of the 1933 placer gold production came from the Dawson district, the Glacier district being next in importance, and the remainder was recovered from old abandoned creeks in the Mayo and Whitehorse districts.

The electric dredges of the Yukon Consolidated Gold Corporation Limited operated as follows: Canadian No. 2 commenced digging on May 15 and closed on October 18. It dredged 1,544,077 cubic yards at a cost of \$99,233 or 6·38 cents per cubic yard. Canadian No. 3 commenced on June 29 and closed October 19. It dredged 704,037 cubic yards at a cost of \$118,655 or 16·85 cents per cubic yard. Canadian No. 4 commenced on May 7 and closed October 15. It dredged 1,432,567 cubic yards at a cost of \$101,964 or 7·12 cents per cubic yard. N.N.W. No. 1 commenced May 15 and closed October 18. It dredged 424,815 cubic yards at a cost of \$83,665 or 19·70 cents per cubic yard. N.N.W. No. 2 commenced on May 16 and closed October 18. It dredged 549,698 cubic yards at a cost of \$93,376 or 16·98 cents per cubic yard.

Hydraulic operations were carried on by this same company on Crofton and Lovett Hills where 614,613 cubic yards of gravel and bedrock were handled at a cost of 12·03 cents per cubic yard.

Dredging operations were continued on Sixty Mile river by the Holbrook Dredging Company. One dredge, steam driven, was operated during the season and 294,115 cubic yards of material were handled.

The record high price received for gold has been a great stimulus to prospecting in the Yukon. Outlying parts of the Territory have been reached by planes; parties have gone into the Liard, the Alsek and the White River regions by this means of travel. No rich discoveries have been reported but prospecting operations are being continued and many abandoned creeks in the older districts have been re-staked and are now producing.

A communication from the Department of Mines, Ottawa, reports that the Nahanni-Frances River district of the Yukon and Northwest Territories is again receiving widespread attention as a result of recent reports of rich placer gold strikes. The communication states that there is ample evidence to show that gold gravels occur throughout the western portion of the district and also show that this area is worthy of careful, systematic and scientific prospecting.

Table 42.—Summary Statistics of Alluvial Gold Mining in Canada, 1932 and 1933

	1932			1933		
	British Columbia	Yukon	Quebec and Alberta	British Columbia	Yukon	(a) Quebec and Alberta
Number of firms and individual operators†..	112	3	5	65	3	5
Time in operation—months.....	6-10	6-8	6-8	6-10	6-8	6-8
Capital employed.....\$	496,670	6,672,148	125,000	3,854,721	6,539,997	6,187
Number of employees.....	171	186	16	254	189	11
Salaries and wages paid.....\$	178,833	465,343	21,535	268,119	431,533	4,499
Fuel and electricity used.....\$	3,139	35,122	579	17,045	18,101	19
Electricity generated for own use.....k.w.h.		12,257,230		95,002	11,206,000	
Crude gold recovered—crude ounce.....	20,400	50,466	236	23,928	48,967	504
Platinum recovered—crude ounce.....	59		0·25	40		
Value of platinum recovered.....\$	2,372		10	1,400		
Quantity of material handled.....cu. yds.	1,053,677	6,051,256	12,000	1,326,721	5,605,522	(d)
Length of ditches—miles (b).....	117	123		84	125	
Total value of alluvial products (c).....\$	349,172	857,922	3,924	408,176	832,439	8,568

†In addition to the number shown in the table, there were several other small operators from whom no returns were obtainable.

(a) Includes data relating to one property in Nova Scotia.

(b) Owned in 1932; used in 1933.

(c) Value of crude gold based on statutory price of the metal (\$20·67) and estimated at \$17·00 per crude ounce.

(d) Information not available.

The Auriferous Quartz Mining Industry

This industry includes the mining and milling of ores in which gold is the predominating metal in value, quartz the prevailing gangue and from which the values are usually recovered by various methods of cyanidation or amalgamation. Refractory ores containing lead, copper, arsenic, antimony or other metals are usually concentrated by selective flotation or other methods and the gold bearing concentrates shipped to smelters for further treatment.

The majority of the larger gold mines in Ontario have adopted straight cyanidation, a few of the smaller producers make recoveries only by amalgamation and in some mills a combination of the two methods has been adopted. The recent introduction of flotation methods in the treatment of some of the Northern Ontario gold ores has materially increased efficiency in milling practice. There is, in the ores from the large Ontario mines, an average proportion of 7 ounces of gold and 1 of silver. A greater variety of gold ores is usually mined in British Columbia than in any of the other provinces. As a general rule each ore with its own peculiar mineral characteristics requires its own individual extraction methods. The high-grade gold-silver-lead ores of the Premier mine in British Columbia are concentrated and the products shipped to other plants for smelting and recovery of the precious metals.

In 1933 returns were received from 214 Canadian auriferous quartz mines, 87 of which produced bullion or shipped ores, while 127 were engaged only in exploration or development. Producing mines in this group shipped 2,352,659 fine ounces of gold in bullion, while ores, slags, etc., shipped from these properties contained 102,706 fine ounces.

NOVA SCOTIA

The recorded gold production of Nova Scotia from 1862 to 1933 inclusive amounted to 926,554 fine ounces. Mining of this metal in the province dates back to the early sixties. Annual yields varying from 6,863 fine ounces to 30,348 fine ounces are recorded from 1862 to 1902. In 1904 production fell to 10,362 ounces and remained close to this quantity until 1910, since then there has been no appreciable increase in production.

Production of lode gold in Nova Scotia during 1933 totalled 1,382 ounces as compared with 964 ounces in 1932. This increase in output reflects a stimulated mining activity throughout the gold-bearing areas of the province. Quartzites and slates largely comprising the gold-bearing series of Nova Scotia are more than 30,000 feet thick and occupy that half of the province lying along the Atlantic coast and extend the full length of the Nova Scotia peninsula. Fairly important amounts of gold have been produced from more than a score of fields and of these all but four or five occur in this eastern part of the province, east of the great granite mass which comes down to the Atlantic coast at Halifax. The gold occurs in quartz veins, most of which lie in thin slate beds between bands of quartzite. The veins are found near the crests of plunging anticlines, and in many instances pass completely across a crest from one limb to another. Some of the wider beds of slate carry several quartz veins, which may be so small that they cannot profitably be separated from the slate. Such "belts" as they are locally termed, attain widths of 10 to 20 feet. Some of them are reported to be sufficiently rich to be worked as a whole and so constitute large bodies of potential low grade ore.

Prospecting or development of gold properties in 1933 was reported from Wine Harbour, Guysborough County; North Brookfield, Queens County; Montague Gold Mines, Halifax County; Tangier, Halifax County; Central Rawdon, Hants County; Dutch Village, Halifax County; Gold River, Lunenburg County; Goldboro, Guysborough County; and Moose River, Halifax County. Some important operations during the year included those conducted at the Montague, Lacey, Locarno, Higgins and Lawlor (Moose River), Killag (Halifax County), and Seal Harbour Mines. Hydro-electric power is now available throughout a large part of the province.

NEW BRUNSWICK

No production of gold was reported from this province during 1933. Prospecting was carried on near the origin of the Tobique, Nepisiguit and Miramichi rivers. A new vein was opened up on the Serpentine river near the mouth of Gold Brook; this consists of large lenses of quartz occurring in schist and is mineralized with pyrite, pyrrhotite, chalcopyrite and arsenopyrite. The vein is reported as auriferous.

Auriferous quartz was also reported as being discovered at the Guagus stream, located about forty miles west of Newcastle.

QUEBEC

The 1933 production of fine gold in Quebec, valued at \$10,950,540 in Canadian funds, is an all-time record for Quebec. The quantity for 1932 was slightly in excess of the 1933 figures but the exchange equalization was higher during the latter year.

In Quebec, lode gold in payable amounts has been found; up to 1932, only in the Rouyn-Haricanaw region, the eastward extension of the Porcupine and Kirkland Lake districts of Ontario. The deposits are of two general types, quartz veins and replacements. The quartz veins are mostly of the high-temperature type, characterized by such minerals as albite and tourmaline. Replacement deposits are of two types—in one the original minerals of the country rock are replaced mainly by carbonates, in the other by silica. The Beattie Gold Mines property in Duparquet township, on which attention is much centred at present, is of the replacement type. A 600-ton flotation mill was completed at this mine in 1933 and started practically at capacity the middle of May. By the end of the year the mill had treated a total of 145,000 tons of ore. The present mill has a capacity of 1,200 tons per day should the production of a lower grade concentrate be desirable. The average grade of ore milled has varied from \$3.50 to in excess of \$4.00 (gold at \$20.67 per ounce). The main ore body is surrounded by assay walls, as values decrease outward, and arbitrary limits are set according to the grade of ore that can be profitably mined. Thus there is a compact mass roughly 1,100 feet long by 100 feet broad estimated to contain about 5,390,000 tons of ore averaging \$3.07 in gold within 500 feet of the surface and deeper drilling indicates that the ore continues to depth. The mineralization is of the disseminated sulphide replacement type; the deposit is the first of its character to be worked in Quebec and much interest is attracted to its development as success here may have a significant bearing on the possible developments of other low-grade gold deposits.

At the Green Stabell mine in Dubuisson township a mill was completed and placed in operation on November 18. This was reported, in February, 1934, to be treating approximately 60 tons per day. The Siscoe Gold mine was in steady operation throughout the year; tonnage milled was reported at 96,347 as compared with 63,998 in 1932. Granada Gold Mines in Rouyn township conducted continuous mining and milling operations in 1933 and considerable development work was completed in addition to extensive diamond drilling. In Boischatel township Arntfield Gold Mines Limited carried on important and continuous surface and underground development operations. The mine and mill of the Bussièrès Mining Company, in Louvicourt township, were in steady production, while in Cadillac township the property of O'Brien and Fowler Limited was active throughout 1933.

Various other prominent gold mining operations were conducted in the north-western part of the province, some of which included those of Canadian Malartic Gold Mines, Limited, Canadian Pandora Gold Mines, Limited, Lamaque Gold Mines, Limited, McWatters Gold Mines, Limited, Mathews Gold Mine, Limited, Northern Quebec Gold Mines, Limited, Stadacona Rouyn Mines, Limited, Stanley Siscoe Extension Gold Mines, Limited, Sullivan Consolidated Mines, Limited, and Thompson Cadillac Mining Company, Limited.

ONTARIO

Although Ontario's 1933 gold output at 2,155,519 fine ounces represents a relatively small decrease from 1932, the value of the 1933 production, including equalization exchange totalled \$61,647,843, the highest ever recorded for this province.

Development and exploration of auriferous deposits, together with intensive prospecting, were general throughout the gold-bearing areas of Ontario during the past year and the results of these activities would indicate a pronounced expansion in the gold mining industry of this already very important gold producing province.

A description by the Geological Survey of Canada of the more salient geology of the Porcupine and Kirkland Lake gold camps is summarized as follows: The rocks in the Porcupine field include basic altered lavas of Keewatin age, unconformably overlain by conglomerates, greywackes and slates of Temiskaming age, all folded into steeply inclined attitudes and intruded by bodies of grey quartz-feldspar porphyry. The veins of the Hollinger, McIntyre, and nearly all the other producing properties lie in the Keewatin greenstones; those of the Dome mine have been found both in the Keewatin and Temiskaming series. The ore in the Hollinger and McIntyre mines consists of quartz and mineralized schist. The Dome ores also consist of quartz and mineralized schist but the original ore bodies were of irregular shape utterly unlike the more or less regular veins and lodes of the Hollinger and McIntyre mines.

In Kirkland Lake area conditions are quite unlike those at Porcupine. The mines are situated in the middle of a large mass of Temiskaming sediments; where the ore bodies occur the sediments are intruded by two igneous rocks, the older a sort of diorite, the younger a reddish syenite porphyry. The ore has formed in the crushed and shattered zone of a fault. The ore consists mainly of mineralized porphyry with more or less quartz. Gold and gold tellurides are the principal constituents of value.

The following data relating to some of the more important Ontario gold mining operations have been supplied through the courtesy of the various companies:

Porcupine Camp.—During 1933 Dome Mines Limited hoisted 566,400 tons; of this 546,500 tons was ore which was sent to the mill and treated, and 19,900 tons was waste which was dumped on the surface. In addition, 28,500 tons of waste was dumped into old stopes. The ore milled yielded bullion worth \$4,453,166.87 at \$20.67 per ounce, the yield per ton milled being \$8.1485. In addition, there was recovered from the re-treatment of by-products the sum of \$71,140.04. Of the tonnage milled, the stopes yielded 487,600 tons, averaging 8.58 dwt. per ton (1 dwt. = 1/20 of an ounce Troy weight), and development work yielded 58,900 tons, averaging 4.58 dwt. per ton. Ore from the stopes wholly in the sedimentary area yielded 160,990 tons, averaging 8.77 dwt. per ton, while ore from stopes wholly in greenstones and partially in greenstones yielded 326,610 tons, averaging 8.24 dwt. per ton. Operating costs for the year were \$3.729 per ton. The ore reserves of the mine are estimated at 2,025,000 tons. This includes 718,600 tons of broken ore but does not include the 250,000 tons indicated as possible ore on the 24th and 25th levels. Ore in the sediments is estimated at 194,000 tons and the ore in the greenstones is estimated at 1,831,000 tons.

Hollinger Consolidated Gold Mines Limited milled 1,727,102 tons of ore of an average value per ton of \$8.26; the net value of gold recovered totalled \$13,778,683.49 (average value received per ounce of gold, \$28.61). The total yearly average cost per ton of ore mined and milled amounted to \$4.1948. Ore reserves of the company on the 1st of December, 1933, consisted of 6,487,559 tons of a total value of \$48,430,451, having an average value of \$7.47 per ton; these figures compare with 6,049,548 tons on the 31st of December, 1932, of a total value of \$45,492,076, having an average value of \$7.52 per ton. In the calculations dealing with ore reserves, the statutory price of gold, namely, \$20.67 per ounce, has been taken as the basis of value, and the same minimum ore grade as used in former years continued. It is interesting to note that 34 per cent of the ore milled came from above the 800-foot level.

McIntyre Porcupine Mines Limited production statistics for the fiscal year ended March 31, 1934, are as follows:

Ore treated.....	776,845 tons
Value per ton 0.339 ounces at \$31.50.....	\$ 10.68
Gross value.....	8,296,704.60
Bullion recovered—	
Gold, 251,985.231 ounces at \$31.50.....	7,936,872.10
Silver, 48,967.95 ounces at .418 cents.....	20,380.44
Total value.....	\$7,957,252.54
Recovered, per ton (0.355 oz.—\$10.24).....	
Bullion marketing costs.....	55,970.01
Net value of bullion recovered.....	\$7,901,282.53

Ore hoisted totalled 785,135 tons and operating costs were:—

	Cost per ton ore milled
Mining—	
Exploration.....	\$0.1194
Development.....	0.4317
Breaking and stoping.....	2.6131
Total mining.....	\$3.1642
Milling.....	\$0.7957
Other.....	0.2265
Grand Total.....	\$4.1864

Ore reserves consisted of 3,064,138 tons of which 2,867,859 tons were estimated; the average gold content of the combined reserves was estimated at .3482 ounces per ton with a value of \$7.20 per ton (gold at \$20.67).

Kirkland Lake Camp.—During the fiscal year ending August 31, 1933, the Teck-Hughes Gold Mines, Limited, treated 474,500 tons of ore. The recovery of bullion and precipitate was the equivalent of 241,041.82 troy ounces of fine gold valued at \$6,139,174.72. After the addition of other income the gross revenue was \$6,246,585.89 or \$13.16 per ton of ore milled.

Following is an analysis of operating costs:—

	Cost per ton of ore treated	Cost per ounce of gold produced
Development and exploration.....	\$ 1.04	\$ 2.04
Mining.....	2.35	4.62
Milling.....	0.97	1.91
General expense.....	0.56	1.12
Examination of new properties.....	0.03	0.06
Depreciation.....	0.62	1.22
Total.....	5.57	10.97

The technical estimate of "positive ore" reserve at September 1st is as follows:—

	Tons	Average grade in penny- weights per ton
Broken ore.....	274,481	11.06
Blocked ore.....	405,500	11.03
Total.....	679,981	11.04

For the twelve months period ending June 30, 1933, Lake Shore Mines Limited produced bullion valued at \$11,406,307.59 from 797,673 dry tons of ore treated in the mill. The recovery per ton of ore milled was \$14.30.

Statement of Lake Shore costs for the year:—

	Cost per ton milled
Development.....	\$ 1.113
Mining.....	2.871
Milling and refining.....	1.256
Marketing bullion.....	.082
General and administrative expense.....	.313
Operating cost.....	5.635
Depreciation.....	.980
Provision for taxes.....	6.615
Total cost.....	1.156
	7.771

Broken ore reserves stood at 219,859 tons valued at \$3,847,550. Reserves of blocked ore were increased during the year.

Wright-Hargreaves in 1933 hoisted and milled 285,465 tons of ore. Production was evaluated as follows: value of gold, \$3,662,837; exchange, \$1,283,431; silver, \$9,691.89; a total of \$4,955,960.43. Analysis of operating costs show a total cost of \$7.145 per ton of ore milled.

Macassa Mines Limited, adjoining the Kirkland Lake Gold mine on the west commenced milling on October 13, and by February, 1934, the daily milling rate was 200 tons.

Among the more prominent gold producers in Ontario areas, other than those of Kirkland Lake and Porcupine, are included the Howey Gold Mines and Ashley Gold Mining Corporation. The former company operates a low grade deposit in the Red Lake district; miscellaneous 1933 operating data reported by this company are:—

Tonnage milled and sorted.....	344,135
Tonnage discarded by sorting.....	53,170
Tonnage milled.....	290,965
Value a ton hoisted.....	\$ 2.73
Value a ton material discarded by sorting.....	\$ 0.54
Value a ton ore milled.....	\$ 3.12
Net percentage recovery a ton of ore hoisted.....	89.5%

During the year the capacity of the mill was increased from 900 tons to 1,350 tons a day; enough ore was treated at this increase to demonstrate that the total operating cost could be reduced to at least \$1.85 a ton. The broken ore reserves in the mine as of December 31, 1933, amounted to 276,526 tons, unbroken reserves totalled 1,751,755 tons and values are estimated between \$3.50 and \$4.00 a ton at the current price of gold.

Tonnage treated at the Ashley mine totalled 37,975 with an average grade of .456 ounces per ton. From this tonnage there was produced and marketed gold bullion which realized, in Canadian funds, \$497,969.

Many other important mining operations were conducted throughout various parts of the province, some of the more outstanding of these being those at the Young-Davidson mine in Powell township; McMillan in Mongowin township; Toburn, Barry Hollinger, Kirkland Lake and Sylvanite in the Kirkland Lake area; Lakeland in Maisonville township; Paymaster, Buffalo Ankerite and Coniaurum in the Porcupine area, and in the Thunder Bay district and other areas in the western part of Ontario extensive mining work was performed by Little Long Lac Mines, Limited, McKenzie Red Lake Gold Mines Limited, Moss Gold Mines Limited (Ardeen), Minto Gold Mines Limited, Northern Empire Mines Limited, St. Anthony Gold Mines Limited, Kenty Gold Mines Limited, Casey Summit Gold Mines, Limited, Parkhill Gold Mines Limited, and others.

MANITOBA

Gold production in Manitoba totalled 125,310 ounces as compared with 122,507 in 1932 and the Department of Mines and Natural Resources for this province reports that in 1933 gold mining experienced great activity both in prospecting and in the development of new properties; new production and development programs announced during the year should result in further increases in the production of gold in the near future.

The San Antonio and Central Manitoba mines treating gold quartz ores produced about 29 per cent of the gold. Small production of gold, totalling a few hundred ounces was reported by the following: Oro Grande Development Company Limited, North British Mining and Milling Company Limited; Hanson, McIlvaine and Rogers; I. G. Warren; Walsh Bros.; Tom Hanna; Capital Interests Limited; Vanson Gold Mines Limited and others.

One of the most interesting of the new gold mining developments is that at God's Lake; in this area shaft sinking was commenced in October, 1933, by God's Lake Gold Mines, Limited. Extensive diamond drilling conducted by this company is reported to have yielded very encouraging results. Extensive exploratory and development operations were also conducted at Island Lake by Island Lake Mines Limited.

The Geological Survey of Canada states in a report issued in 1932 that throughout the whole of eastern Manitoba and the adjacent part of Ontario, the gold deposits have the same genetic relations as in the Lake of the Woods district. In eastern Manitoba the rocks consist of lavas and interbedded sediments intruded by . . . a later granite. The gold deposits are quartz veins associated with the later granite. Similar conditions occur in that part of the northern Manitoba field extending from Amisk lake to Wekusko lake. The greater part of the gold is free; accompanying sulphides, in most of the known properties, carry a minor percentage of the values.

SASKATCHEWAN

The gold output of this province consists almost entirely of the precious metal estimated as contained in ores extracted from that part of the Flin Flon copper deposit lying on the Saskatchewan side of the boundary.

The Saskatchewan Department of Labour, Railways and Industries at Regina, reports that during 1933 a considerable number of mining claims were staked in close proximity to the Hudson Bay Mining and Smelting Company's mine at Flin Flon. Many of the claims are in Saskatchewan in the neighbourhood of Phantom, Douglas and Bootleg lakes. In addition to these newly staked claims, some activity is anticipated at Beaver Lake on the Graham claims and on the Amisk Lake Gold Mining Syndicate, the latter properties now being in litigation.

ALBERTA

There is no record of any important gold production from Alberta. Efforts to profitably recover comparatively small quantities of gold contained in the sand and gravels of the Saskatchewan river have been attempted and in 1932 the McLeod River Mining Corporation installed and adjusted a gold dredge on the McLeod River; two small shipments of crude gold were made during that year but no production was reported in 1933.

Production from Alberta during 1933 represents shipments made to the Royal Canadian Mint, Ottawa, and is assumed to be of alluvial origin.

BRITISH COLUMBIA

Gold production in British Columbia amounted to 238,995 ounces as compared with 199,004 in 1932. Of the output during 1933, 122,293 ounces were contained in gold bullion produced from lode mining and 19,142 ounces in crude placer gold, the remainder was contained in blister copper and base bullion made and in ores exported.

In British Columbia practically all of the known lode gold deposits are in mesozoic rocks and are considered to be genetically related to the great intrusion of granodiorite known as the coast range batholith, or to batholiths, approximately contemporaneous with it.

Deposits mined wholly or largely for their gold content have been, until recently, comparatively few. The mines of Bridge River and Sheep creek districts, the Hedley deposits, the Surf Inlet mine and the Engineer mine, are those in which gold is or was almost the only constituent of value. In the Rossland deposits and the Premier mine, gold was the principal constituent, occurring with copper and other metals. Some gold is recovered from sulphide bodies of more or less complex composition, which are mined mainly to recover other metals (copper-gold-silver and silver-lead ores).

The Department of Mines of British Columbia states that in 1933, as in 1932, gold mining activity was the brightest phase of British Columbia's mining industry. During the year activity was general throughout the province, with particular attention being devoted to the Bridge River, Cariboo and Nelson-Salmo areas. In 1934 it was indicated that increased activity in the Bridge River, Nelson-Salmo, and Penticton-Rock Creek-Greenwood areas will take place. In these, as well as in many other mining camps scattered throughout the province, prospecting and scouting engineers are re-examining old properties and new discoveries in the light of recent price developments for gold, and many new developments have been planned for 1934.

During 1933 the Bralorne mill capacity was increased from 120 to 200 tons per day. The old motherlode mill, acquired by the Reno Gold Mines, was reconstructed and brought into full production on a 75-ton per day basis. The small pilot mill at the Vidette mine was reconstructed, also a 30-ton per day mill was constructed at the Surf Point mine and production commenced. At the Second Relief mine near Nelson the milling plant was reconstructed and increased to handle 40 tons per day. Small milling plants of a few tons per day capacity were under construction at various places in British Columbia.

At the Premier mine, in the Salmon river section, exploration, which included 6,045 feet of diamond drilling, was continued adjacent to the producing areas but no new ore of importance was located. The total tonnage produced in 1933 amounted to 185,421 dry tons. Total output for the year amounted to 49,469 ounces of gold and 1,002,487 ounces of silver. The Big Missouri mine in the same area resumed exploratory operations.

The sequence of events, which may, without exaggeration, be termed "the second Cariboo Gold Rush," illustrates very pointedly the far-reaching beneficial effect of the growth of the mining industry. Locally, that effect was very marked, states the British Columbia Department of Mines. The old towns of Barkerville, Quesnel and Stanley were transformed and rapidly expanded both in size and population; a new town named Wells, after Fred. Wells, appeared on the map. Employment was found for hundreds.

The output of the Cariboo Gold Quartz Mining Company, Limited, for 1933 totalled \$228,908, a distinctly satisfactory result in view of the fact that this property, which commenced milling operations on January 2, 1933, was experiencing its first year of productive life.

During 1933 Pioneer Gold Mines Limited, operating in the Bridge river area, mined and milled 100,159 tons of ore, producing 82,519 ounces of fine gold. The mill has been steadily treating over 300 tons of ore per day. Development on the lower levels, below the tenth, on the main vein at the shaft, has exposed fine ore bodies, the bottom of the fourteenth level is reported as exceptionally promising. In the same area Bralorne Mines Limited reported the very encouraging development of a good grade of milling ore; some 6,000 feet of development work was done during the year on the Nos. 6, 7, 8 and 10 levels, mainly developing the King vein.

Other gold developments in the province include those at the Engineer, Dunwell, Windpass, Nicola, Union, Grandoro, Home, Morning Star, Midway, Meridian, Monarch, Kootenay Belle, Venus-Juno, Queen, Enid Julie, Wayside, etc.; these are described in detail in the 1933 annual report of the British Columbia Department of Mines, Victoria, B.C.

YUKON

The following information relating to auriferous quartz mining in the Yukon is from the report on mining lands in the Yukon Territory, by the Department of the Interior, for the fiscal year ending March 31, 1934:—

"Prospecting has continued in the Carmacks district with very satisfactory results on what is known as the Langham group of claims on Mount Free Gold. W. J. Langham ran a 65-foot tunnel on the border of the Goose and Fish Hook claims; several open cuts were also made and the finding of good ore is claimed. No further development was done during the year on the Lone Star group near Dawson. Thirty-seven quartz grants were issued in the Dawson district during the year."

Table 43.—Capital Employed in the Auriferous Quartz Mining Industry in Canada, 1932 and 1933

Province	Operating mines	Capital employed as represented by					Total
		Present value of land, buildings, fixtures, machinery, tools, equipment, etc.	Inventory value of materials on hand, stocks in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)		
1932	No.	\$	\$	\$	\$	\$	
Nova Scotia.....	4	154,274	67,500	10,000	1,500	233,274	
Quebec.....	32	5,092,383	309,797	3,946	670,358	6,076,484	
Ontario.....	31	24,899,269	2,796,355	444,218	17,091,506	45,231,348	
Manitoba.....	5	1,746,814	103,112	20,345	136,908	2,007,179	
British Columbia.....	28	2,151,099	191,921	163,834	2,112,196	4,619,050	
Canada.....	100	34,043,839	3,468,685	642,343	20,012,468	58,167,335	
1933							
* Nova Scotia.....	12	423,727	34,809	9,000	30,476	498,012	
Quebec.....	64	19,456,293	368,139	132,979	1,761,111	21,718,522	
Ontario.....	54	78,480,305	2,483,512	849,286	26,934,101	108,747,204	
Manitoba.....	15	6,071,036	163,755	30,901	108,068	6,373,790	
British Columbia.....	71	17,029,930	349,338	297,430	3,585,705	21,262,403	
Canada.....	216	121,461,321	3,399,553	1,319,596	32,419,461	158,599,931	

*In Nova Scotia there are usually a few small operations that are unreported.

Table 44.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1932 and 1933

	Nova Scotia, Saskat- chewan and Manitoba	Quebec	Ontario	British Columbia	Canada
1932					
Number of producing mines.....	7	5	26	27	65
Ore mined..... tons	93,954	125,093	5,541,969	311,649	6,072,665
Ore milled..... tons	80,750	107,990	5,496,731	238,888	5,924,359
Tailings retreated..... tons	3,140	251	174	17,164	3,140
Concentrates produced..... tons	22	.....	.....	.....	17,611
Bullion recovered by amalgamation..... crude oz.	2,584	61,751	150,449	24,170	238,954
Bullion recovered by cyanidation..... crude oz.	53,516	9,937	2,878,736	43,096	2,985,285
Bullion shipped..... crude oz.	58,602	72,856	3,029,960	66,189	3,226,637
Content of bullion shipped—Gold..... fine oz.	37,912	63,003	2,254,068	57,846	2,412,829
Silver..... fine oz.	5,220	5,789	426,703	11,329	449,041
Value..... \$	785,114	1,303,940	46,709,290	1,199,143	49,997,487
Exchange premium..... \$	100,166	165,282	6,165,189	155,029	6,585,666
Net value of ores, slags and residues sold..... \$	1,551	4,278	66,725	1,990,065	2,062,619
Total value of all shipments..... \$	886,831	1,473,500	52,941,204	3,344,237	58,645,772
1933					
Number of producing mines.....	12	7	28	40	87
Ore mined..... tons	117,130	360,041	5,632,869	418,814	6,528,854
Ore milled..... tons	106,719	344,747	5,612,199	383,111	6,446,776
Tailings retreated..... tons	.....	.....	.....	3,658	3,658
Concentrates produced..... tons	7	11,428	1	18,812	30,248
Bullion recovered by amalgamation..... crude oz.	12,203	80,238	186,365	36,689	315,495
Bullion recovered by cyanidation..... crude oz.	37,942	5,564	2,523,309	128,124	2,694,939
Bullion shipped..... crude oz.	50,538	86,468	2,711,059	164,813	3,012,878
Content of bullion shipped—Gold..... fine oz.	37,305	76,919	2,116,142	122,293	2,352,659
Silver..... fine oz.	6,070	5,918	404,744	26,579	443,311
Value..... \$	772,300	1,591,596	43,897,662	2,544,653	48,806,211
Exchange premium..... \$	293,653	655,973	15,503,709	1,001,456	17,454,791
Net value of ores, slags and residues sold..... \$	1,075	554,480	165,088	2,169,890	2,890,533
Total value of all shipments..... \$	1,067,028	2,802,049	59,566,459	5,715,999	69,151,535

Table 45.—Ores, Concentrates and Slags Shipped from the Auriferous Quartz Mines in Canada, 1932 and 1933

Item	*Ontario mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
1932					
Number of mines.....	10	2	21	5	38
Tons of ore, etc., shipped.....	469	30	36,145	53,661	90,305
Metal content—					
Gold.....oz.	2,691	869	17,620	68,318	89,498
Silver.....oz.	9,105	9,296	306,647	1,311,044	1,636,092
Copper.....lb.	398				398
Lead.....lb.			6,558	1,139,748	1,146,306
Zinc.....lb.					
Arsenic.....lb.					
Net value.....\$	52,283	20,271	378,023	1,612,042	2,062,619
1933					
Number of mines.....	9	4	29	9	51
Tons of ore, etc., shipped.....	352	10,483	30,289	21,954	63,078
Metal content—					
Gold.....oz.	6,353	24,241	16,157	55,955	102,706
Silver.....oz.	12,575	12,096	159,911	1,015,900	1,200,482
Copper.....lb.	1,142	551		1,471	3,164
Lead.....lb.			701,541	696,390	1,397,931
Zinc.....lb.				48,954	48,954
Net value.....\$	133,233	587,410	432,825	1,737,065	2,890,533

*Includes two mines in Quebec and three in Manitoba in 1932 and two mines in Quebec, and two in Manitoba in 1933.

Table 46.—Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1932 and 1933

Province	1932						1933					
	Number of employees					Salaries and wages	Number of employees				Salaries and wages	
	On salary	Wage-earners			Total employees		On salary	Wage-earners				Total employees
		Sur-face	Under-ground	Mill				Sur-face	Under-ground	Mill		
*Nova Scotia.....	4	36	18	.....	58	\$ 54,376	7	26	10	3	46	\$ 38,389
Quebec.....	92	316	289	24	721	1,094,566	222	665	495	61	1,443	1,986,074
Ontario.....	463	1,853	6,008	528	8,852	15,141,003	499	2,159	6,208	658	9,524	15,907,542
Manitoba.....	18	70	131	27	246	430,740	50	145	186	29	410	636,525
British Columbia.....	56	199	254	57	565	965,899	165	547	595	93	1,400	1,967,482
Canada.....	633	2,474	6,700	635	10,442	17,686,584	943	3,542	7,494	844	12,823	20,536,012

*In 1932, contains data for one property in Saskatchewan.

Table 47.—Wage Earners, by Months, in the Auriferous Quartz Mining Industry, 1931-1933

Month	1931	1932	1933
January.....	8,273	9,476	10,764
February.....	8,482	9,494	10,815
March.....	8,681	9,383	10,808
April.....	8,746	9,557	10,918
May.....	9,030	9,819	11,229
June.....	9,319	9,984	11,836
July.....	9,345	10,118	12,381
August.....	9,285	10,171	12,754
September.....	9,391	10,168	12,636
October.....	9,524	10,292	13,060
November.....	9,496	10,373	12,841
December.....	9,323	10,255	12,443

(5) The Copper-Gold-Silver Mining Industry

The copper-gold-silver mining industry comprises a group of mines producing ores in which copper is usually the predominating metal in both value and quantity. The precious metals in these ores, especially during periods of depressed base metal prices, are often very deciding factors in the economic working of some mines of this type.

In northwestern Manitoba and in the Rouyn district of Quebec, important ore deposits of copper-gold sulphide ores, some of which contain zinc in commercial quantities, have been successfully developed and mined during recent years.

NEW BRUNSWICK

Work of an exploratory character was carried out on the copper ores of Adams Island in Charlotte county. This was conducted only during the summer months, the property remaining idle during the winter of 1933-34.

QUEBEC

The mine and mill of the Consolidated Copper and Sulphur Co., Eustis, were in continuous operation throughout 1933. Shipments of copper and iron pyrites concentrates were made to the United States. The company completed a considerable amount of development work consisting of shaft sinking, crosscutting, drifting and raising. This is Canada's oldest copper producing area, the Eustis mine being opened here in 1865.

The tonnage and average grade of ore shipped in 1933 from the Horne mine to the Noranda smelter and concentrator were as follows:—

	Tons	Metal Copper	Content	
			Gold	Silver
			Per ton	Per ton
Direct smelting ore.....	497,807	3.48%	0.325 oz.	0.52 oz.
Silicious fluxing ore.....	365,399	0.64%	0.166 oz.	0.15 oz.
Concentrating sulphide ore.....	678,318	2.369%	0.152 oz.	0.35 oz.
Total.....	1,541,524			

This total represents an increase of 26.5 per cent over that for the previous year.

During 1933 the Noranda smelter treated 1,010,629 tons of ore, concentrate and refinery slag from which were produced 65,008,731 pounds of fine copper, 284,675 ounces of gold and 510,739 ounces of silver; the corresponding figures for 1932 were 918,567 tons of ore, etc., treated, 63,013,485 pounds of fine copper, 341,350 ounces of gold and 619,597 ounces of silver produced.

The following table shows the amount of ore treated by the Noranda concentrator since it was placed in operation:—

Year	Tons
1928.....	4,468
1929.....	51,689
1930.....	191,856
1931.....	317,792
1932.....	379,637
1933.....	676,168

From information obtained in drifting, diamond drilling, inclined raising and other openings in the various Horne ore bodies, there is now indicated above the 2,475-foot level the following tonnage of the three classes of ore treated:—

	Tons	Copper	Gold per ton
Direct smelting ore.....	5,875,000	7.34%	0.144 oz.
Concentrating ore.....	16,580,000	1.12%	0.197 oz.
Silicious fluxing ore.....	890,000	0.15%	0.130 oz.

Notwithstanding the fact that ore shipments were increased 26.5 per cent over the shipments for the previous year, the tonnage of ore reserves shows a very material increase. The construction of an addition to the concentrator, designed to provide additional capacity of 1,000 tons per day and also to regrind and re-treat the entire mill tailing, was started in October, 1933.

In Desmeloizes township, the Normetal Mining Corporation commenced work on their property (Abana) in August. The shaft was deepened to 800 feet and two new levels established at 675 and 800 feet with the object of developing ore previously indicated by diamond drilling. There were no shipments of ore made from the mine.

Operations of an exploratory nature were conducted in the Rouyn area in 1933 by Brownlee Mines Ltd., Glenwood Mining Co. Ltd., Astoria Rouyn Mines, Ltd., Bagomac Rouyn Mines, Ltd., and others. Towards the latter part of the year Aldermac Mines Ltd., operating in Bois-chatel township, hoisted and milled some 2,500 tons of copper ore and made a small shipment of concentrates to the Noranda smelter.

During the year Noranda's subsidiary, the Waite-Ackerman-Montgomery Mines Ltd. changed its name to Waite Amulet Mines, Ltd. Now that these properties are united, ore from both mines will be treated in the Amulet mill at such time as production is resumed.

ONTARIO

Practically all of the copper produced in Ontario during recent years was derived from the nickel-copper ores of the Sudbury district. Data relating to the mining of these ores are contained in the chapter on the nickel-copper industries in Canada.

Gold contained in ores mined by the International Nickel Company of Canada, Limited, was recovered during 1933 in metallurgical plants operated at Copper Cliff, Ontario, and Acton, England. Gold sales in 1933 were reported by the company at 21,355 ounces. Falconbridge Nickel Mines, Limited, also operating in the Sudbury district, report that at the end of 1933 construction work was going on at its Norwegian refinery in preparation for separating the precious metals contained in matte shipped from Canada.

The only other mining of Ontario copper-bearing ores in 1933 consisted of the hoisting of a relatively small tonnage from the Amity mine situated at Boston Creek, on the T. & N. O. Railway; this production went to the Noranda smelter.

MANITOBA

The mining of copper-gold-silver ores in Manitoba during 1933 was almost entirely confined to the operations on the Flin Flon deposit of the Hudson Bay Mining and Smelting Co. Ltd. It is to be noted that these particular ores possess an important zinc content.

During 1933 the Hudson Bay Mining and Smelting Co. Ltd. mined from both open pit and underground, and milled a total of 1,604,869 tons of ore averaging per ton .084 ounces gold, 1.26 ounces silver, 1.68% copper and 3.9% zinc from which, together with 610 tons of purchased custom ore, it produced and sold 94,745 ounces of gold, 1,210,666 ounces of silver, 40,941,102 pounds of copper and 46,305,736 pounds of zinc. The company reports that gross income from sales of metals produced during the year was \$7,422,446.58 and after deduction of operating costs, interest, depreciation and taxes, a profit of \$780,524.18 was earned.

The daily tonnage of ore mined from underground was 1,755 tons and there was delivered from underground to the mill 640,178 tons of ore which assayed—gold, .088 ounces; silver, 1.28 ounces; copper, 1.82%, and zinc, 4.0%. In addition 299 tons of disseminated ore went direct to the smelter to be used as fettling material.

The open pit, as usual, was operated continuously during the year. There were mined from the open pit and sent to the concentrator during the year 963,924 tons of ore assaying:—gold, .081 ounces; silver, 1.24 ounces; copper, 1.59%, and zinc, 3.8%. In addition, 4,072 tons were sent direct to the smelter and 5,412 tons of material, which at higher metal prices will be workable, were placed in a special low grade stockpile. Three major and two minor blasts were fired in the open pit in 1933. These three blasts broke a total of 1,310,554 tons of material.

The concentrator during 1933 treated a total of 1,604,869 tons of ore or 165,218 tons more than the amount treated in 1932. From the above tonnage there were produced 239,590 tons of copper concentrates assaying:—gold, .333 ounces; silver, 4.57 ounces; and copper, 8.98 per cent; and 80,780 tons of zinc concentrates assaying gold, .088 ounces; silver, 1.94 ounces; copper, 1.10 per cent; and zinc, 45.0 per cent.

The cyanide annex continued to operate successfully during the year and the higher price for gold made its operation even more advantageous than in the past. This plant treated 966,603 tons of sulphide ore tailings from which was recovered zinc dust precipitate containing 15,142 ounces of gold, 157,828 ounces of silver and 66,027 pounds of copper. This material was sent direct to the copper converters.

There were treated by the zinc plant during the year 66,869 tons of zinc concentrates.

The copper smelter was operated continuously during the year; almost entirely upon concentrates produced by the company; only 610 tons of custom ore and concentrates were treated.

Notwithstanding the steady increase in the yearly rate of ore production the ore reserves of the mine have been fully maintained both as to tonnage and grade. The company reports that the property is in good condition and that it now employs, continuously, 1,250 men and its operations directly support the town of Flin Flon which has approximately 5,000 inhabitants. A considerable number of men have been taken from Manitoba and Saskatchewan farms, trained to work at the mill, and have become intelligent and satisfactory workmen. This is a help to the farmers of the two provinces inasmuch as a good part of the money received by this class of labour is returned by workmen to help out their people at home.

SASKATCHEWAN

Copper-gold-silver ores mined in this province come entirely from that part of the Flin Flon ore body lying to the west of the Saskatchewan-Manitoba boundary. Particulars relating to the operations of the Hudson Bay Mining and Smelting Company in 1933 are included under Manitoba.

BRITISH COLUMBIA

The mining of copper-gold-silver ores in British Columbia during 1933 was largely confined to the Hidden creek and Bonanza mines of the Granby Consolidated Mining, Smelting and Power Co., Ltd., and to the Britannia mine on Howe Sound.

During the first part of 1933 a strike at the Anyox plants of the Granby Company necessitated the suspension of operations for a short period. With very creditable energy and organization, operations were quickly resumed and have continued on a normal capacity basis, the mill treating about 5,000 tons of ore daily. The British Columbia Department of Mines states that at Hidden Creek a feature of the mining has been the breaking of large ore-tonnage from old stope-sills and bottoms by large blast mining methods. At the Bonanza mine production has been maintained and exploration has been carried out on the north side of the second level with indications of ore and structure continuity.

At Anyox the average net cost of producing copper is shown in the following extract from the 1933 Annual Report of the Granby Consolidated Mining, Smelting and Power Co., Ltd.

"The net cost per pound of refined copper produced, after allowing credits for gold and silver values and miscellaneous income, but exclusive of depreciation and depletion, was 6.74 cents.

"Recalculations of the ore reserves of the Hidden Creek and Bonanza mines were made during the year. The reserves at the end of the year, compared with the previous year, were as follows:—

	December 31, 1932	December 31, 1933
Anyox-Hidden Creek mine.....	3,870,365 tons	3,426,700 tons
Anyox-Bonanza mine.....	307,327 tons	138,131 tons
Allenby-Copper Mountain mine (idle)	9,885,069 tons	9,885,069 tons

"As forecast in last year's report of the Company, at the present rate of extraction, and unless new ore is found, the recoverable ore reserves of the Anyox mines will be exhausted in about two years."

Ore milled by the company in 1933 totalled 1,534,200 tons having an average copper content of 1.31 per cent as compared with 1,740,300 tons with a copper content of 1.27 per cent in 1932.

In 1933 the Britannia Mining and Smelting Co., Ltd., operated on a curtailed basis with the object of giving employees sufficient work to keep them and keep the organization intact as far as possible. Ore was mined almost entirely from the East Bluff mine where the gold content is higher and the zinc content is sufficient to warrant a zinc separation. High grade zinc concentrates containing 54 per cent zinc were shipped from the Britannia for the first time. These shipments could not be made under normal production conditions as the general run-of-mine ore would not contain enough zinc to make the separation economical. There were 622,718 tons of ore milled (compared with a tonnage of 1,920,339 in 1929) from which about 8,000,000 pounds of copper (including precipitates), 12,819 ounces of gold and 42,799 ounces of silver were recovered. The pyrite-concentrate production of the company amounted to 16,629 short tons.

The re-opening of the Rossland properties of the Consolidated Mining and Smelting Co. to leasers resulted in a production of over 7,000 ounces of gold from unworked stope and shaft pillars in the old Le Roi, Centre Star, Josie, War Eagle and other mines.

Table 48.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1932 and 1933

Province	Number of operating mines	Capital employed as represented by				
		Present value of land, buildings, fixtures, machinery, tools, equipment, etc.	Inventory value of materials on hand, stocks in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1932	No.	\$	\$	\$	\$	\$
New Brunswick, Manitoba and Saskatchewan	5	5,349,623	927,079	788,828	363,260	7,428,790
Quebec.....	11	1,925,227	67,236	33,303	221,608	2,247,374
British Columbia.....	14	4,436,503	280,115	64,793	335,797	5,117,208
Canada.....	30	11,711,353	1,274,430	886,924	920,665	14,793,372
1933						
Ontario, Manitoba and Saskatchewan.....	4	13,928,110	1,098,754	735,638	86,106	15,848,608
Quebec.....	17	7,102,815	56,936	11,244	288,665	7,459,669
British Columbia.....	8	15,351,459	341,668	654,080	573,151	16,920,358
Canada.....	29	36,382,384	1,497,358	1,400,962	947,922	40,228,626

Table 49.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, 1932 and 1933

	Quebec, Manitoba, and Saskatchewan	British Columbia	Canada
	tons	tons	tons
1932			
Ore mined.....	2,903,432	2,549,736	*5,453,173
Ore milled.....	2,058,100	2,549,559	4,607,659
Copper concentrates produced.....	346,916	171,693	518,609
Pyrite concentrates produced.....	36,128	35,817	71,945
Zinc concentrates produced.....	76,507		76,507
1933			
Ore mined.....	3,232,581	2,215,909	5,448,690
Ore milled.....	2,363,981	2,157,320	4,521,301
Copper concentrates produced.....	397,422	123,977	521,399
Pyrite concentrates produced.....	40,070	19,284	59,354
Zinc concentrates produced.....	80,780	7,865	88,645

*Includes 5 tons mined in Saskatchewan.

†Includes 200 tons mined in Ontario.

Table 50.—Shipments from Copper-Gold-Silver Mines in Canada, 1932 and 1933

Destination	Quantity	Net value	Content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
1932	Tons	\$	Fine oz.	Fine oz.	Pounds	Tons	Pounds
14 mines shipped to Canadian smelters—							
Ores.....	850,451	3,283,720	314,784	564,983	51,905,334		
*Copper concentrates.....	451,117	6,479,044	129,356	1,386,662	110,311,196		
Zinc concentrates.....	76,507	455,348	7,535	157,843	2,181,377		68,258,142
3 mines shipped to Foreign smelters—							
Ores.....	54	3,065	157	28			
Copper concentrates.....	37,558	758,053	8,868	87,346	18,625,044		
Pyrite concentrates (a).....	52,049	164,529				24,829	
Zinc concentrates.....							
Total.....	1,467,736	11,143,759	460,700	2,196,862	183,022,951	24,829	68,258,142
1933							
9 mines shipped to Canadian smelters—							
Ores.....	867,789	914,642	223,494	328,918	39,561,914		
*Copper concentrates.....	495,370	4,859,812	171,954	1,619,387	107,952,457		
Zinc concentrates.....	80,780	565,460					55,938,867
4 mines shipped to Foreign smelters—							
Ores.....	120	3,700	132	193	11,578		
Copper concentrates.....	28,541	1,104,146	12,933	65,969	14,654,498		
Pyrite concentrates.....	58,604	189,050				28,178	
Zinc concentrates.....	8,929	70,460					9,374,675
Total.....	1,540,133	7,707,270	408,513	2,014,467	162,180,447	28,178	65,313,542

*Contains some metals recovered from cyanide precipitate produced in Manitoba.

(a) Contains shipments to Canadian paper mills.

Table 51.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, 1932 and 1933

	1932		1933	
	Number	Salaries and wages	Number	Salaries and wages
SALARIED EMPLOYEES—		\$		\$
Total.....	143	350,866	159	306,363
WAGE-EARNERS—				
Surface.....	773	3,419,761	610	3,632,415
Underground.....	1,719		1,671	
Mill.....	441		401	
Total.....	2,933	3,419,761	2,682	3,632,415
Grand total.....	3,076	3,770,627	2,841	3,938,778

Table 52.—Wage-earners by Months in the Copper-Gold-Silver Mining Industry, 1931, 1932 and 1933

Month	1931	1932	1933
January.....	3,198	3,099	2,657
February.....	3,098	3,137	2,298
March.....	3,142	3,114	2,398
April.....	3,063	3,089	2,565
May.....	3,089	3,067	2,651
June.....	3,139	3,039	2,678
July.....	3,099	2,804	2,726
August.....	3,139	2,795	2,867
September.....	3,094	2,775	2,826
October.....	3,123	2,837	2,878
November.....	3,139	2,706	2,807
December.....	3,106	2,666	2,798

CHAPTER THREE

THE SILVER MINING INDUSTRY IN CANADA

Including the Silver-Cobalt Mining Industry, the Silver-Lead-Zinc Mining Industry, and Commodity Statistics Tables on Arsenic, Cobalt, Silver, Lead and Zinc.

1. General Review.
2. The Silver-Cobalt Mining Industry.
3. The Silver-Lead-Zinc Mining Industry.
4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc.

1. General Review

(a) **Definition of the Industry.**—Silver mining is not a distinct industry in Canada, as silver is found, as an ore, usually in association with those of other commercially valuable metals; with lead and zinc, as in many of the western mines; with the cobalt and nickel arsenides of northern Ontario; with radium and uranium at Great Bear Lake, N.W.T.; and in copper and other metalliferous ore deposits. Silver is nearly always found alloyed or associated with both alluvial and lode golds from which it is recovered in the refining of the crude gold bullion. This precious metal is, therefore, a rather common constituent in many of our mineral deposits, especially in those of the non-ferrous ores, and its value as a mine product is sometimes a deciding factor in the economical working of an ore body. It is the paramount value in the rich native silver-cobalt ores of Ontario, while in the silver-lead-zinc industry it is usually recovered as an important by-product. The mining and smelting of argentiferous lead and zinc ores are very important industries, especially in British Columbia, and the silver recovered from this type of ore is a distinct contribution to the mineral production of Canada. It is therefore realized that the mining and metallurgy of silver bearing ores are closely interwoven with those of other important metals principally lead and zinc and in order to make a comprehensive survey of the Canadian silver production it is imperative to consider its various sources of origin.

(b) **Historical.**—History pertaining to early Canadian silver and lead mining is meagre. We find in Cape Breton, evidence of early colonial efforts to mine galena ores, and from the records of the French regime we find mention by Champlain of argentiferous galena on the east shore of Lake Temiskaming, this deposit was later worked under the name of the Wright mine. It is stated that early last century small shipments of galena ore were made to Europe from deposits on the east shore of Hudson's Bay. In Ontario, silver-bearing veins were found as early as 1846 in the vicinity of Thunder Bay on Lake Superior. It was not until 1866 that Thomas McFarlane discovered in this district high grade silver ore in important commercial quantities. This, a sensational "find", was made on a small rocky island not more than 90 feet in diameter and located but a short distance off Thunder Cape. The property, later known as the Silver Islet mine, produced until 1884, the year of its abandonment, approximately \$3,250,000 in silver. Some of the other producing mines of this period in the Port Arthur district were the Silver Mountain, Beaver, Rabbit Mountain and Porcupine.

Construction of the Temiskaming and Northern Ontario railroad during 1903 was highly instrumental in the finding of one of the world's richest silver areas. Grading operations along what was then known as Long Lake in northern Ontario revealed veins possessing a mixture of unfamiliar minerals, leaves and wires of a white sectile metal were found on the surfaces of pinkish coated (erythrite) vein fillings. It was only after specimens of these "queer rocks" were sent south for identification and the announcement officially made of the discovery of important native silver and cobalt ores that the country became keenly interested. Silver discoveries and mine development in the South Lorrain and Gowganda areas followed shortly after the original finds at Cobalt and represent the results attained in the widened sphere of the prospecting activity subsequent to the first "boom" in Coleman township.

History is silent as to any important silver production or discoveries in the Prairie Provinces. Small amounts have been recorded as coming from either Manitoba or Alberta and chiefly represent the metal recovered in the refining of crude gold bullion and during the past few years an increasing quantity of silver has been recorded from the Copper-Gold ores of the Flin Flon mine situated on the Saskatchewan-Manitoba boundary. The dawn, or perhaps more aptly put, the false dawn of the silver-lead mining industry in British Columbia reaches back into the early decades of placer prospecting. The gravel miners penetrating the unexplored upper waters of the auriferous streams eventually encountered widespread evidence of metalliferous deposits. Rich float found in the valley bottoms was sometimes traced up the mountain sides to its source of origin, resulting in the discovery of potential mines. Early development and exploration were greatly delayed by lack of railroad facilities and it was not until late in the eighties that any appreciable production was registered. Small shipments aggregating \$37,925 were made in 1887 from various camps in the Kootenay district. It may be of interest, to note here, that the Monarch mine at Field, discovered in 1884, was a small shipper during 1887 and after 45 years of intermittent operation was reopened under sound financing in 1930 and again commenced shipping silver-lead-zinc ores under modern and more efficient mining methods. Active operations in the Ainsworth camp date from about 1888 and those in the Sardon-Silverton areas from about 1892. The discoveries of the North Star, Saint-Eugène and famous Sullivan deposits were made in East Kootenay during 1892 and 1893.

In 1930 high grade silver-radium ores were discovered at Great Bear Lake, Northwest Territories, these have been actively developed and small annual shipments of ore have since been made to metallurgical plants.

Gold was discovered in the Yukon river as early as 1869 and we find, in succeeding years, a synchronous silver production which originated in the alluvial recoveries of the former crude metal. These silver values mounted to impressive figures during the height of the Klondike placer operations. Some argentiferous lode discoveries were made in the Yukon during 1899, but there appears to have been little, if any, production therefrom until 1910, in which year an output of 37,418 ounces of vein silver was recorded. In July, 1919, L. Beauvet made the first outstanding discovery of valuable silver-lead ores in commercial quantities. This find occurred at Keno Hill, 40 miles northwest of the town of Mayo. Ore shipments from these deposits commenced during the winter of 1920-1921. It was during the latter year that the rich Sadie-Friendship vein was found. All ores and concentrates from this area are shipped to outside plants for smelting.

(c) Sources and Status of Silver, Lead, Zinc, Cobalt and Arsenic.—Statistics on the production of silver from Canadian ores include (a) silver contained in silver and gold bullion produced, (b) silver contained in blister copper or lead bullion made, and (c) silver estimated as recoverable from ores of all kinds exported for treatment in foreign smelters.

Figures on lead for 1933 include lead contained in base bullion made at the Trail smelter and lead estimated as recoverable from ores exported from mines in the Yukon and British Columbia. Small quantities of lead, contained in ores and silver-lead-bismuth bullion, recovered by the smelters treating cobalt ores are also included.

Canada's 1933 zinc output was in the form of refined metal produced by the Consolidated Mining and Smelting Company at Trail, B.C., and the Hudson Bay Mining and Smelting Company at Flin Flon, Manitoba.

For two decades the ores of the Cobalt district of Ontario had been the main source of the world's supply of cobalt, but since 1926, owing to the production of cobalt by the Union Minière du Haut Katanga, from Central African copper-bearing ores, Canada's production was reduced to less than half of the world's output.

From 1904 to 1910 the Canadian cobalt production figures represent an estimate of the cobalt content of the ores shipped from the mines. From 1911 until the present time cobalt production is computed by adding the cobalt metal and the cobalt content of all cobalt oxides and salts manufactured and sold by the Ontario smelters to the cobalt paid for in ores and residues exported for treatment in foreign smelters.

Arsenic is produced in Canada from the cobalt-silver-nickel-arsenic ores of the Cobalt district by the smelter of the Deloro Smelting and Refining Company Limited, at Deloro, Ontario. Prevailing low prices and an instability of demand have prevented any expansion in the production of arsenic in Canada during recent years.

Among the metals produced in Canada during 1933 zinc held fourth position, lead fifth and silver sixth in point of value. This represents for silver and zinc values a complete reversal of positions as compared with those held in 1932.

The year under review witnessed a distinct improvement in lead and zinc production, the output of the former metal experiencing a 4.1 per cent increase over 1932 while zinc production was 15.6 per cent higher. An analysis of the statistics pertaining to silver production reveals that the recession in output from the previous year was largely attributable to a pronounced decline in the metal recovered from the cobalt-silver-arsenic ores of Northern Ontario and, to a lesser extent, to the smaller recoveries of the metal from argentiferous blister copper produced in British Columbia and Quebec and reduced exports of silver-lead ores from the Yukon Territory. The reduced output of cobalt and arsenic reflected decreased activities in the mining of cobalt-silver ores in Northern Ontario camps.

2. The Silver-Cobalt Mining Industry

Only mining and milling are considered in this chapter. Smelting of the cobalt ores, in so far as the Canadian operations are concerned, is treated in the chapter on "The Non-Ferrous Smelting and Refining Industry."

Following the production derived from Silver Islet and other properties of the Port Arthur district, comparatively little silver was produced in Ontario until the discovery in 1903 of the sensationally rich ores of the Cobalt area. From 1904, when the output of silver was over 3,000,000 ounces, the production increased rapidly until the peak was reached in 1910. In that year Ontario produced 30,366,366 ounces of silver, two years later production declined to 29,000,000 ounces and thereafter followed a generally downward trend until 1921 when less than 10,000,000 ounces were reported.

Silver recovered as a by-product in the treatment of gold, copper-gold and copper-nickel ores is of increasing importance in offsetting the decline in the recovery of this metal from arsenical-cobalt ores. Ontario is the only province producing cobalt and refined arsenic.

The mining of Canadian silver-cobalt-arsenic ores is confined to Northern Ontario and their output has revealed an almost continuous decline during recent years, the tonnage hoisted in 1933 being 14.4 per cent less than in 1932 and 70 per cent under 1931. The reason for this diminishing production is largely attributable to depletion of deposits or the low prices for silver.

In the Cobalt camp proper during 1933 the Cross Lake mine of M. J. O'Brien Limited was the only property remaining in operation by the original owners. In addition to work at this property several lessees, companies or syndicates produced silver or cobalt from the Beaver, Foster, Kerr Lake, Temiskaming, Coniagas, Silver Queen, Agaunico, Peterson Cobalt, McKinley, Townsite-City and Buffalo mines. The Nipissing Mining Company Ltd., although not in operation, made shipments of silver and cobalt ores and silver bullion. The silver ore and base bullion were obtained from a clean-up of the mill and the refinery when they ceased operations in April, 1932. There were no shipments of residue or fine bullion from the Nipissing stocks at Cobalt. The well-known mill of this Company was destroyed by fire in August. At Gowganda the Miller Lake O'Brien mine of M. J. O'Brien Limited was in steady production throughout the year.

The Department of Mines, Ontario, reports that "while a further advance in the price of silver would enable a number of properties to re-open and increase considerably the present output from the silver-cobalt areas, the fact remains that the major portion of the metals has been won and future operations will centre around the recovery of ore overlooked in previous operations."

Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1931, 1932 and 1933

	1931	1932	1933
Number of mines in operation (x).....	26	20	14
Ore mined..... tons	200,729	70,442	60,326
Ore treated..... tons	97,747	68,363	59,304
Tailings treated..... tons	.....	23	.....
Concentrates produced..... tons	6,535	1,514	1,063
Quantity of material cyanided..... tons	39,173	4,567	.....
Bullion recovered..... fine oz.	1,025,015	120,777	.....
Bullion sold or shipped..... fine oz.	201,662	.....	39,781 (a)
Value of bullion, ore, concentrates and residues sold..... \$	1,925,593	1,735,708	1,071,602

(x) All mines located in Northern Ontario.

(a) Base bullion from clean-up.

Table 53.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
Capital employed as represented by:—		
(a) Cost of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	863,296	439,436
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	174,353	70,514
(c) Inventory value of finished products on hand.....	314,038	1,112,533
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	1,654,185	1,743,272
Total.....	3,005,872	3,365,755

Table 54.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1932 and 1933

	1932		1933	
	Number	Salaries and wages	Number	Salaries and wages
		\$		\$
SALARIED EMPLOYEES—				
Total.....	34	107,850	25	59,929
WAGE-EARNERS—				
Surface.....	109	443,405	66	262,352
Underground.....	170		117	
Mill.....	56		34	
Total.....	335	443,405	217	262,352
Grand Total.....	369	551,255	242	322,281

3. The Silver-Lead-Zinc Mining Industry

CANADA

Silver-lead-zinc ores are widely distributed in Canada. Deposits containing these metals have been either investigated or developed in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, British Columbia, the Yukon, and the Northwest Territories. The mining and metallurgical treatment of this type of ore is largely confined to British Columbia where the growth of this particular branch of the mining industry is closely associated with the successful development and treatment of the Sullivan mine ores by the Consolidated Mining and Smelting Company of Canada.

QUEBEC

Silver-lead-zinc ores were mined from 1910 to 1929 at the Tetreault Mine, Notre Dame des Anges; during the latter year 29,798 tons of flotation concentrates were shipped from this property to foreign smelters. Considerable exploratory work was conducted on an extensive system of lead-zinc veins in Lemieux township, Gaspé. There was no production of lead or zinc in the province since 1930.

ONTARIO

Lead and zinc mineralization is fairly common in certain sections of Ontario. Several years ago lead ores were mined and smelted in Frontenac and Hastings counties. During the years immediately preceding 1931 the greater part of the Ontario lead production came from the now abandoned Kingdom mine at Galetta. All of these deposits in eastern Ontario possess more or less common characteristics; veins are usually in or associated with crystalline limestones of the

Grenville series and the vein matter generally consists of calcite, galena, and zinc blende. A distinctly different type of lead deposit was developed at the Errington mine in the Sudbury field where ore deposition occurs in a major fault zone passing through slates and tuffs of pre-Cambrian age. The crushed zone is, in sections, several hundred feet wide; development indicates that the ore occurs in a number of separate and often parallel shoots. Ore consists of quartz, lead, zinc and copper sulphides, carbonate, rock inclusions and massive iron pyrites; the last mineral has been replaced, in part, by zinc blende, galena and copper pyrites. No lead mines have been operated in Ontario since 1931.

MANITOBA

Silver production in Manitoba during 1933 amounted to 1,101,578 fine ounces valued at \$416,758. This was contained in blister copper made at the Flin Flon smelter and in crude gold bullion produced from auriferous quartz ores. No lead ores are mined in Manitoba; important quantities of zinc are recovered from the Flin Flon deposit.

SASKATCHEWAN

The production of silver recorded for Saskatchewan in 1933 totalled 114,604 ounces valued at \$43,358 and represents the estimated quantities of the metal recovered from Flin Flon ores mined on the Saskatchewan side of the Manitoba boundary by the Hudson Bay Mining and Smelting Co. Ltd.

BRITISH COLUMBIA

British Columbia is by far the most important producer of silver-lead-zinc ores in Canada and the 1933 report of the British Columbia Department of Mines contains the following information:—"The Sullivan and Premier mines remained the principal producers of silver, however, an increased output was made by the mines of the Beaverdell area, where several small, but high-grade, silver mines continued production. Should the price for silver be advanced to 50 or 60 cents per ounce in conjunction with increased lead and zinc prices, expansion in the silver mining industry would materialize quickly. . . The bulk of the lead produced came from the Sullivan mine of the Consolidated Mining and Smelting Company of Canada, Ltd. This was supplemented by renewal of production at the Monarch mine of the Base Metals Corporation at Field in August of 1933. There should be an important production from the Monarch in 1934 as it is being operated at a capacity of 300 tons of ore per day. The Slocan and northern producers of lead-zinc-silver ores are still inactive for the most part, although the gradual betterment in metal prices is having a tendency to stimulate operations by leasers and small companies. Much of the improvement in lead prices is due to the favourable position of the exchange markets between Canada and Great Britain. The main zinc production was from the Sullivan mine. The Monarch mine, also an important producer of zinc, was operated for the last four or five months of 1933. Production of zinc concentrates was started during 1933 at the Britannia mine."

The 1933 Directors' Report of the Consolidated Mining and Smelting Company of Canada, Ltd., states:—"After providing for current development, adding \$17,731.75 to employees' pension fund (besides taking care of the year's disbursements on this account) and paying taxes (\$175,171.91) there was a surplus of \$3,989,037.36. Deducting the write-offs for depletion and depreciation, \$535,940.87 and \$2,396,822.97, respectively, there remained \$1,056,273.52 compared with a deficit of \$2,908,107.49 in 1932. The year's results permitted the payment of a dividend of six per cent, or \$1.50 a share, without drawing on the profit and loss account.

Production of the company during 1932 and 1933 was as follows:—

		1932	1933
Lead.....	pounds	253,237,783	254,639,548
Copper.....	pounds	767,026	541,459
Gold.....	ounces	33,346	22,393
Bismuth.....	pounds	57	70,724
Zinc.....	pounds	130,567,785	137,619,895
Cadmium.....	pounds	65,425	246,041
Silver.....	ounces	5,522,366	5,551,349

At the Sullivan mine the mining costs in 1933 set a new low record, beating the previous record which was made in 1932 by about 7 per cent. Total production for the year amounted to 1,413,418 tons comprising 12,532 tons of crude lead ore shipped to Tadanac and 1,400,886 tons of lead-zinc ore to the concentrator at Kimberley; a reduction of 34,030 tons from the shipments in 1932. The concentrator treated 1,401,061 tons from which were produced 172,386 tons of lead concentrates and 175,110 tons of zinc concentrates. Very favourable developments are reported in a lower level of the Sullivan and many years of profitable mining are assured."

Ore reserves at the Monarch mine when re-opened in August, 1933, were:—

	Tons of ore	Ounces silver per ton	Per cent lead	Per cent zinc
West Monarch.....	318,100	2.4	18.0	18.0
East Monarch.....	41,500	1.1	26.2	15.2
Kicking Horse.....	75,000	3.0	5.0	15.0
	434,600	2.4	14.6	17.2

Since operations were resumed, development work has put more ore in sight than has been extracted. The cost of mining at the Monarch, including all overhead, office, depreciation on equipment, insurance and contingencies was \$38,448.05, equivalent to \$1.04 per ton of ore trammed to the mill. The total cost of milling, including overhead, office, depreciation on equipment, insurance and contingencies was \$40,425.05, or \$1.32 per ton of ore.

DISTRICT OF MACKENZIE

Deposits of lead ore situated about 32 miles southwest of Fort Resolution on Great Slave Lake were actively explored in 1929 by the Atlas Exploration Company. It is stated that the occurrences are of considerable economic importance and resemble, to some extent, those of the lead-zinc deposits in Missouri and other Mississippi valley states.

Exploration work was carried out by Eldorado Gold Mines Limited on its pitchblende silver deposits at Labine Point on the east side of Great Bear Lake. These were discovered in 1930 and represent the most important discoveries of high-grade native silver ores in Canada during recent years. The first commercial shipments of radium-silver ores were made from this area in 1932.

In 1933 Eldorado Gold Mines Limited erected a concentrating mill with a crushing and grinding capacity of at least 75 tons per 24 hours and a concentrating capacity of 25 tons. Milling of ore was commenced during the year under review. The annual report of the company states that milling has been of an experimental nature and the mill is proving to be a valuable adjunct to the mine for concentration of pitchblende as well as silver. The process used is gravity concentration on Wilfley tables followed by flotation. The policy of the company during 1933 was to confine its efforts to the development of the LaBine Point property and particularly to the most favourable pitchblende areas; this because of the low price of silver and of the necessity of having available pitchblende to keep the new Port Hope radium extraction plant working to capacity, this plant reached commercial production of radium and uranium compounds in 1933.

The Consolidated Mining and Smelting Company of Canada, Ltd., reports that in the course of the development of its Great Bear Lake property, shipments of high grade ore were made and gave satisfactory returns. Indications are so favourable that plans are under way for the installation of further equipment during the summer of 1934. Development is being continued.

Considerable prospecting and exploration was accomplished in the district and important development work conducted on some of the more important properties, including those of the White Eagle Silver Mines Ltd. and Bear Exploration and Radium. It has been announced that Great Bear Lake Mines Ltd. will conduct extensive development work, in 1934, on its Hottah Lake silver claims.

YUKON

The Department of the Interior, Ottawa, states in a report respecting mining activities in the Territory during the past fiscal year:—"Owing to the low price of silver and the suspension of requirements of section 54 of the Yukon Quartz Mining Act re representation work, many of the claim owners moved to other parts of the Territory to seek employment, consequently very little development work was done on quartz claims in the Mayo district. A few, financially able to remain in the district, developed their ground and discovered some very rich deposits, further demonstrating the possibilities of this camp whenever the price of silver becomes stabilized. The Treadwell Yukon Company Ltd. closed down their operations at Keno Hill in the fall of 1932, and transferred their operations to the "Elsa" claim on Galena Hill. Considerable high grade ore was mined and shipped from this property during the summer and fall of 1933, when this camp was closed down. A small crew of twenty odd men were moved to the old 'Silver King' mine where exploratory work is being carried on at the present time."

Table 55.—Shipments of Lead Ores and Concentrates from Canadian Mines, 1924-1933

(For years 1913 to 1923 see 1928 report on the Mineral Production of Canada)

Year	Shipments		Lead content in pounds	Silver content in ounces
	Tons	Value		
		\$		
1924.....	153,396	12,290,699	180,187,124	4,348,243
1925.....	208,588	15,420,756	237,675,311	6,024,213
1926.....	255,048	17,546,728	273,963,827	8,616,164
1927.....	275,328	13,044,514	308,903,620	8,831,840
1928.....	255,944	12,178,879	322,239,859	10,287,591
1929.....	258,203	15,990,117	328,877,236	10,177,926
1930.....	259,630	11,024,912	336,976,074	10,172,485
1931.....	193,370	5,678,421	253,963,266	8,502,392
1932.....	190,700	4,241,652	246,051,119	8,031,587
1933.....	200,686	5,756,420	266,522,718	7,405,322

In 1932 and 1933 figures include silver in silver-radium ore shipped from Northwest Territories.

NOTE.—For complete metal contents of silver-lead-zinc ore shipments see Table 57.

Table 56.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry in Canada, 1932 and 1933

		Yukon	British Columbia	Canada
1932				
Ore mined.....	tons	40,119	1,492,453	1,532,572
Ore milled.....	tons	38,614	1,467,066	1,505,680
Concentrates produced—Lead.....	tons	3,298	167,424	170,722
Zinc.....	tons		200,156	200,156
Copper.....	tons			
		Yukon and North-west Territories	British Columbia	Canada
1933				
(x) Ore mined.....	tons	4,909	1,451,073	1,455,987
Ore milled.....	tons		1,435,357	1,435,357
Concentrates produced—Lead.....	tons		178,379	178,379
Zinc.....	tons		182,142	182,142
Others (data not available for publication).....	tons			

(x) Includes silver-pitchblende ores mined in Northwest Territories.

Table 57.—Destination of Shipments from Silver-Lead-Zinc Mines of Canada, 1932 and 1933*

Products shipped	Tons shipped	Net value at shipping point	Total metal content as determined by settlement assay			
			Gold	Silver	Lead	Zinc
		\$	fine oz.	fine oz.	lb.	lb.
1932						
To Canadian smelters—						
Lead ore.....	18,609	266,598	1,516	745,831	5,548,630	818,876
Lead concentrates.....	167,538	2,980,395	18,582	4,140,209	236,446,355	15,257,708
Zinc ore.....						
Zinc concentrates (x).....	200,156	914,713		357,934	13,666,316	198,993,788
Dry ore.....	454	10,989	535	40,103		
Total.....	386,757	4,172,695	20,633	5,284,077	255,661,301	215,070,372
To foreign smelters—						
Lead ore.....	229	38,701	7	107,049	302,903	
Lead concentrates.....	3,807	935,294	228	2,959,962	3,753,231	
Zinc ore.....						
Zinc concentrates.....						
Dry ore.....						
Total.....	4,036	973,995	235	3,067,011	4,056,134	
1933						
To Canadian smelters—						
Lead ore.....	17,315	351,754	2,563	747,107	8,960,712	1,561,005
Lead concentrates.....	172,882	4,598,533	4,749	4,312,318	245,193,821	14,803,258
Zinc ore.....						
Zinc concentrates (x).....	175,240	1,767,130	2	344,193	11,969,713	179,473,005
Dry ore (a).....	596	23,207	183	54,457	23,787	
Total.....	366,033	6,740,624	7,497	5,458,075	266,148,033	195,837,268
To foreign smelters—						
Lead ore.....	2,619	371,363	253	1,273,199	1,764,243	
Lead concentrates.....	7,274	411,563	67	1,018,241	10,580,155	
Zinc ore.....						
Zinc concentrates.....	6,966	46,317				8,408,405
Dry ore.....						
Total.....	16,859	829,243	320	2,291,440	12,344,398	8,408,405

(x) Does not include zinc concentrates produced from copper-gold-zinc ores in Manitoba.

(a) Includes shipments of silver ores and pitchblende from Northwest Territories. Information relating to radium content of pitchblende is not available for publication.

*Shipments of silver-lead ores were made entirely from mines in British Columbia and the Yukon in 1932 and 1933; shippers from whom returns were received numbered 22 in 1932 and 27 in 1933.

Table 58.—Capital Employed in the Silver-Lead-Zinc Mining Industry in Canada, 1932 and 1933

Province	Capital employed as represented by				
	Present value of land, buildings, fixtures, machinery, tools, equipment, etc.	Inventory value of materials on hand, stocks in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1932	\$	\$	\$	\$	\$
Quebec and Yukon.....	5,793,878	211,590	157,034	316,059	6,478,561
British Columbia.....	4,543,226	342,692	1,300	555,288	5,442,506
Canada.....	10,337,104	554,282	158,334	871,347	11,921,067
1933					
Quebec, Yukon and N.W.T.*.....	4,535,108	224,375	34,741	719,486	5,513,710
British Columbia.....	10,845,796	894,739	79,639	371,142	12,191,316
Canada.....	15,380,904	1,119,114	114,380	1,090,628	17,705,026

*Includes data relating to silver and silver-pitchblende ores mined in the Northwest Territories.

Table 59.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1932 and 1933

Province	1932						1933					
	On salary	Mine		Mill	Total	Salaries and wages	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Underground					Surface	Underground			
						\$						\$
British Columbia.	95	214	417	229	955	1,378,849	110	223	407	235	975	1,252,016
†Yukon and Quebec.	20	62	36	11	129	340,337	28	50	47	.....	125	248,996
Canada.....	115	276	453	240	1,084	1,719,186	138	273	454	235	1,100	1,501,012

†Includes data on silver-radium mining operations in Northwest Territories.

Table 60.—Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1932 and 1933

Month	1932	1933
January.....	1,012	832
February.....	1,016	820
March.....	1,031	830
April.....	1,019	797
May.....	1,003	795
June.....	980	839
July.....	973	853
August.....	973	942
September.....	966	976
October.....	919	1,007
November.....	905	1,017
December.....	886	944

4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc

ARSENIC

Arsenic in the native state is a metallic mineral but is produced at the present time in Canada only in the oxide form. The entire production is recovered at Deloro, Ontario, in the smelting of the silver-cobalt arsenides of Northern Ontario by the Deloro Smelting and Refining Company.

Occurrences of arsenical minerals are fairly numerous in Canada and arsenical gold-bearing ores have been worked in Nova Scotia, Québec, Ontario, Manitoba and British Columbia.

Arsenic is utilized for various purposes; as an insecticide it is one of the principal constituents of Paris green and of lead and calcium arsenates; it is also employed as sodium arsenite for weed killing. Other uses include its adoption in the manufacture of certain glasses, cattle and sheep dips, paints, tanning supplies, wood preservatives and pharmaceutical preparations.

Of the United States arsenic output, in 1932, 71 per cent was used in the manufacture of insecticides, which require arsenic of the highest grade; 11 per cent for weed killers (used principally by railroads), fungicides, and wood preservatives; and about 2 per cent in glass manufacture; and the balance (about 16 per cent) sold for export. Due to its extensive use for boll-weevil control in the cotton fields of the South, calcium arsenate has become the leading product made from white arsenic, more important even than lead arsenate, which finds its chief use in poison sprays and dusts for destruction of the codling moth, plum curculio, cabbage worm, potato bug, tobacco hornworm and other pests that attack fruits and vegetables. The removal of arsenical spray residues from fruits and other food products for human consumption is receiving a great deal of consideration both in the United States and abroad.

The most important source of arsenic outside the United States, and probably the most important potential source in the world, is the Boliden gold-copper-arsenic mine in Sweden. This mine is scheduled to be operated at the rate of 400,000 tons of ore annually, and since it carries 10 per cent arsenic, it could supply practically the entire world's demand.

Table 61.—Production of Arsenic in Canada, 1924-1933

(For production from 1885-1923, see Annual Report Mineral Production, 1928)

Year	Arsenic in ore		White arsenic		Year	Arsenic in ore		White arsenic	
	tons	\$	tons	\$		tons	\$	tons	\$
1924.....	513	39,185	1,798	309,108	1929.....	766	17,314	1,849	154,006
1925.....	714	21,513	1,003	108,789	1930.....	1,011	34,523	1,250	95,004
1926.....	545	12,687	1,992	134,124	1931.....			1,787	135,170
1927.....	667	15,644	2,447	196,335	1932.....			1,212	98,714
1928.....	708	16,539	2,008	176,513	1933.....			734	56,534

Table 62.—Production (As_2O_3), Exports and Imports of Arsenic, for Canada, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
PRODUCTION—						
From arsenical concentrates exported.. lb.						
White arsenic and arsenic in other forms lb.	3,575,936	135,170	2,424,342	98,714	1,468,022	56,534
Total..... lb.	3,575,936	135,170	2,424,342	98,714	1,468,022	56,534
EXPORTS—						
Arsenic, As_2O_3 lb.	3,092,500	116,044	1,788,600	65,287	934,400	33,778
IMPORTS—						
White arsenic..... lb.	167,015	5,824	425,995	16,694	164,642	5,674
Sulphide of arsenic..... lb.	10,412	1,347	111,106	4,277	27,694	3,117
Arsenate of soda and stannate of..... lb.	704	202	5,603	1,159	390	101
Arsenate of lead..... lb.	1,248,460	116,996	830,120	80,488	498,673	44,266
Calcium arsenate..... lb.	821,509	42,107	521,546	27,852	287,420	17,426

Table 63.—World Production of Arsenic, 1931-1933

(Long tons)

(Supplied by Imperial Institute)

Country and product	1931	1932	1933	Country and product	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom—				Germany—			
White arsenic and arsenic				Ore (arsenic content).....	1,821	193	(a)
soot.....	177	247	121	Greece—			
Union of South Africa—				White arsenic.....	649	278	251
White arsenic.....	9	4		Pyrites (As. content).....	372	227	(a)
Canada—(Sales)				Portugal—			
Gold concentrates (As_2O_3				White arsenic.....	156	10	2
content).....				Sweden—			
White arsenic.....	1,596	1,082	655	Ore (arsenic content).....	11,005	19,719	37,839
Federated Malay States—				White arsenic.....			847
Arsenic.....	133			Roumania—			
Australia—				Pyrites (As. content).....	122	27	61
White arsenic.....	1,070	1,964	1,776	Mexico—			
FOREIGN COUNTRIES				White arsenic.....	7,829	3,707	4,623
Belgium (exports)—				United States—			
White arsenic.....	2,462	2,013	2,538	White arsenic.....	15,301	11,343	9,509
Czechoslovakia—				China— (Estimated)			
Ore (As. content).....		1	55	Ore (As. content).....	500	470	400
France—				Japan—			
Ore (arsenic content).....	5,683	4,390	(a)	White arsenic.....	2,547	2,596	2,338
White arsenic.....	4,650	6,233	(a)	Korea—			
				White arsenic.....	(a)	(a)	150
				Turkey—			
				Arsenic ore (As. content).....	22	3	750
				Brazil—			
				White arsenic.....	176	(a)	(a)

NOTE.—About 5,000 tons of ore were recorded as produced in U.S.S.R. (Russia) during 1927—later figures are not available.

White arsenic is produced in Germany.

(a) Information not available.

COBALT

Since the discovery of the Cobalt camp in 1903, and until recent years, the greater part of the world's supply of cobalt was derived from the treatment of cobalt-silver-arsenic ores mined in Northern Ontario. During the past few years Canada's production of cobalt decreased sharply in contrast to the totals for earlier years. This was due largely to depleted ore reserves and to new competition in the world's markets arising from the development of cobaltiferous deposits in Central Africa. There is at present only one metallurgical works in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Ltd., situated at Deloro, Ontario. This company conducted continuous operations throughout 1933 producing cobalt metal, cobalt salts and cobalt oxide.

The use of cobalt—in the United States at least—reports the United States Bureau of Mines, is "about evenly divided between the metallurgical industry, which employs the metal, and the glass, porcelain, enamel, chemical and paint industries which purchase the oxide and other compounds. The leading use of the metal is in stellite alloys—cobalt—tungsten-chromium combinations for high-speed tools, hard-facing and wear-resisting metal, and sundry corrosion-resisting purposes. Permanent magnets of cobalt steel account for some quantity of the metal and cobalt finds its way into a variety of other steels, including high-speed steel."

An interesting new cobalt alloy for dental purposes is described in "Iron Age." It is an alloy of cobalt, tungsten and chromium and is claimed to be particularly non corrosive to the action of food acids. It has unusual strength and elasticity and is quite wear-resistant, even more so than the gold alloys and when polished it has beauty and brilliancy.

According to a recently issued D.O.T. report (No. 563 of 1934) by the British Consul-General at Leopoldville, the production of cobalt in the Belgian Congo has been deliberately stopped during the past two years to help to stabilize the market for this product. Total average annual consumption of cobalt metal is calculated at about 1,000 tons, but in 1930 no less than 1,202 tons of copper-cobalt alloy were produced in the Katanga alone. (Chemical Trade Journal).

The Union Minière du Haut-Katanga states in its 1933 annual report that the demand for cobalt was greater than for the previous year and could be met easily.

An alloy containing about 50 per cent cobalt was being produced in 1933 by Rhokana Corporation, Ltd., Northern Rhodesia. This was being made at the rate of 40 tons per month and arrangements have been made to refine the product. The annual report of the Corporation states that sales on a commercial scale have been taking place since September 1, 1933.

In 1922 the average price of \$3.25 per pound was used in computing the annual production value; \$2.85 was the price used for 1923 and from 1924 to date the values given in the report have been based on returns actually received by the operators.

A bounty of six cents a pound on the metallic content of cobalt and nickel oxides was paid by the Ontario government from 1907 to 1917.

"Metal and Mineral Markets" report cobalt prices, New York, July, 1934, as follows:—per pound—metal imported from Belgium, 97 to 99 per cent, \$2.50 less 35 per cent for cash. On yearly requirements, usual rebate of 5 to 10 per cent, as to quantity. London quotes 4s. 6d. per pound. Cobalt ore—per pound of cobalt, 12 to 14 per cent grade, 45 cents, f.o.b. cars, Ontario. Cobalt oxide—per pound, (N.Y.), black oxide, 70 to 71 per cent grade, \$1.35.

A summary of the cobalt production from 1924 is shown in the following table. The quantities given are the cobalt content of all smelter products sold or shipped, such as cobalt metal, the oxides, mixed oxides, residues, etc.

Table 64.—Production of Cobalt from Canadian Ores, 1924-1933

Year	Pounds	Year	Pounds
1924.....	948,704	1929.....	929,415
1925.....	1,116,492	1930.....	694,163
1926.....	664,778	1931.....	521,051
1927.....	880,590	1932.....	490,631
1928.....	956,590	1933.....	466,702

NOTE.—For years 1904 to 1923 see previous reports.

Table 65.—Production in Canada, and Exports of Cobalt, 1931-1933

	1931		1932		1933	
	Pounds	\$	Pounds	\$	Pounds	\$
PRODUCTION— Cobalt, computed as cobalt in metal, oxides and salts sold, and in ores and residues exported.....	521,051	651,179	490,631	587,957	466,702	597,752
EXPORTS— Cobalt alloys, cobalt metalics, cobalt oxides, cobalt salts and cobalt ores.....		735,225		589,334		552,450

Table 66.—World Production of Cobalt, 1931-1933

(Supplied by *Imperial Institute*)

Country	1931	1932	1933
	Cwt.	Cwt.	Cwt.
BRITISH EMPIRE			
Canada (c).....	4,652	4,381	4,167
India (b).....	2,000	2,500	2,300
Australia (metal).....		60	125
Northern Rhodesia.....			2,330
FOREIGN COUNTRIES			
Belgian Congo (d).....	7,280	6,590	12,160
French Morocco (ore).....		11,220	12,000
United States (e).....			11

NOTE.—Complex ores containing Cobalt ore are also found in Germany and China, but Cobalt content is not available.

(b) Estimated Cobalt content of nickel-speiss exported to Hamburg.

(c) Metal recovered from smelter products plus Cobalt contained in Cobalt residues exported.

(d) Content of metal, oxide and salts produced at Oolen (Belgium) from ores raised in the Belgian Congo.

(e) Recovered at an electrolytic zinc plant.

Silver

At the London Monetary and Economic Conference of July, 1933, important action was taken with a view to mitigating fluctuations in the price of silver. The Monetary and Financial Sub-Commission unanimously adopted a resolution recommending to all Government parties to the Conference that, among other things, they refrain from further debasement of their silver coinage below a fineness of 800/1000 and that where possible they substitute silver coins for low-value paper currency.

In addition to the above recommendations of general applicability, definite agreements were entered into between the chief silver holding countries and the main silver producing nations. Under the Eight-Power Agreement, signed July 22, 1933, India and Spain agree to limit total sales during the ensuing four years to 140 million and 20 million ounces respectively, while China undertakes during the same period to cease entirely selling silver from demonetized coins. On the other hand, the chief producing countries, Australia, Canada, Mexico, Peru and the United States, agreed not to sell any silver but to make aggregate purchases from (or otherwise arrange for withholding from market) domestic production totalling 35 million ounces annually. Under a separate Five-Power Agreement, of the same date, Canada accepted the quota of 1,671,802 ounces as her share of the total amount to be so purchased (or otherwise withheld from sale). The action of the delegate of Canada in signing this agreement at London was approved by Parliament on February 26.

Silver to the above amount is, in the first instance, to be purchased by the Minister of Finance from domestic mine production at the market price and, in accordance with amendment to the Dominion Notes Act of June 26, 1934, will be held as additional security for the redemption of Dominion Notes. Subsequent instalments for the years 1935, 1936 and 1937 will be purchased by the Bank of Canada when directed to do so by the Minister of Finance. The silver thus purchased under the agreement may, by Section 26 of the Bank of Canada Act, constitute a part of the reserves which the Bank is to hold against its outstanding note and deposit liabilities.

The first step toward implementing the silver purchase agreement has recently been taken by the Minister of Finance in his notice calling for tenders as of August 20, 1934, for the delivery of silver bullion up to an amount of 250,000 ounces.

The President of the United States in an executive order issued December 21, 1933, ratified the silver agreement adopted at the World Economic Conference in London and provided for the purchase of newly mined domestic silver, half to be coined and half to be retained as seigniorage. President Roosevelt signed the Silver Purchase Act of 1934 on June 19. The Act declares it to be the policy of the United States to increase the proportion of silver to gold in the nation's monetary stocks until one-fourth of the monetary value of such stocks shall be represented by silver. A tax of 50 per cent on profits from speculative activities is imposed and the government under the Act may completely control silver stocks held in the United States. Federal control of monetary metals in the United States was extended to silver with the issuance by President Roosevelt on August 9, 1934, of an executive order and proclamation nationalizing silver and providing for surrender of all silver stocks to the government within ninety days at a fixed price of 50·01 cents an ounce.

In their annual review of the silver market, Handy and Harmon, New York, state that data available indicates that during 1933 about 24,000,000 ounces of silver were used in the United States and Canada by the arts and industries, which is an increase of 2,000,000 ounces over the previous year's consumption. As usual, more metal was employed in the manufacture of silverware than in any other one product, and 1933 figures showed a gain of 12 per cent to 15 per cent over those of 1932. Sterling silver flatware increased 15 per cent to 18 per cent; sterling silver hollowware remained practically unchanged; and plated ware increased 18 per cent to 20 per cent. The chemical industry, which includes photographic film absorbed about 15 per cent more ounces in 1933 than in 1932, and gains were also recorded in the use of silver for industrial purposes such as chemical equipment and special alloys for brazing and soldering. On the other hand, less silver was used for dental products and jewellery.

Handy and Harmon also report as follows:—"That although supplies of newly mined metal will probably increase somewhat under stimulus of higher prices prevailing in certain countries, we do not anticipate an annual output of anything like the pre-depression figures of 250,000,000 ounces. Our reasons for this contention are the previously* mentioned situation in Mexico; the probability that industrial demand for the base metals, of which silver is a by-product, will not for some time assume the proportions of the prosperity era; and the fact that a large part of the future copper production will be derived from ores which contain little or no silver."

That the annealing or softening temperature of cold-worked copper is appreciably increased by almost unbelievably small amounts of silver has been known since 1916; silver-bearing copper finds considerable use in industry as it retains its strength in operations involving soldering or tinning. Silver is effective in raising the softening temperature of high-conductivity, tough pitch, cold-worked material for very short anneals and also for heating periods of months. Cold-worked copper containing almost no silver is completely softened on heating for a few days at 150 degrees C., whereas copper of the same hardness containing 10 ounces of silver per ton is not greatly softened when maintained at this temperature for a year.

Importance of maintaining purity of ice used in food products is very apparent yet methods employed have hardly been efficacious. Recently, however, difficulties seem to have been overcome by the catadyne method of sterilizing water by silver electrolysis which not only frees from bacteria but acquires germicidal action. Only a small quantity of silver is needed for dissolving in the freezing water, viz., a few tenths of a gramme to 70 gallons of water. At a Dresden factory in Germany the process is worked on a large scale with 20 tons of activated ice produced daily.

The approximate value of silver consumed in Canada during 1933 in the manufacture of jewellery, silver nitrate, kodak film, etc., amounted to \$434,000.

*"In the United States the price of silver itself is not the determining factor in its production, because so large a proportion of the white metal is mined as a by-product; and in Mexico production may well have been retarded as a result of the Mexican Government's insistence that mining companies maintain their output throughout the years of low prices. This policy necessitated the working of the richest ores; but now the higher quotations for silver permit the use of poorer ores, it would seem as if the consequent smaller recovery would tend to offset the stimulating effect of higher prices."

Table 67.—Production of Silver in Canada, by Provinces and by Sources, 1932 and 1933

	1932		1933	
	Quantity	Value	Quantity	Value
	fine oz.	\$	fine oz.	\$
NOVA SCOTIA— In gold bullion—Total.....	47	15	104	39
QUEBEC— In gold ores, in blister copper, and in copper ores exported—Total....	628,902	199,184	471,419	178,351
ONTARIO— In silver bullion and nuggets.....	4,781,174	1,514,276	2,762,748	1,045,225
In gold bullion.....	426,703	135,144	404,744	153,126
In blister copper produced; and in ores, concentrates, residues and matte exported or treated in smelters outside the province.....	1,127,911	357,228	1,368,188	517,624
Total.....	6,335,788	2,006,648	4,535,680	1,715,975
MANITOBA— In gold bullion and in blister copper—Total.....	1,036,497	328,275	1,101,578	416,758
SASKATCHEWAN— In ores shipped to Canadian smelters—Total.....	14	4	114,604	43,358
ALBERTA— In alluvial gold—Total.....	9	3	32	12
BRITISH COLUMBIA— In alluvial gold.....	3,672	1,163	4,307	1,629
In gold bullion.....	11,329	3,588	26,579	10,056
In blister copper.....	596,810	189,019	346,120	130,947
In base bullion and in ores exported.....	6,681,651	2,116,188	6,360,051	2,406,185
Total.....	7,293,462	2,309,958	6,737,057	2,548,817
YUKON AND NORTHWEST TERRITORIES— In alluvial gold.....	9,084	2,877	8,814	3,335
In ores exported or shipped to Canadian smelters.....	3,044,104	964,117	2,218,662	839,382
Total.....	3,053,188	966,994	2,227,476	842,717
Canada.....	18,347,907	5,811,081	15,187,950	5,746,027

For 1933 fine silver was valued at 37·8328 cents per ounce, the average price for the metal on the New York market expressed in Canadian funds; for 1932 the corresponding price was 31·67163 cents.

Table 68.—Production of Silver in Canada for Years Specified, 1887-1933

Year	Ounces	Cents per ounce	Year	Ounces	Cents per ounce
1887.....	355,083	98·00	1924.....	19,736,323	66·78
1891.....	414,523	98·00	1925.....	20,228,988	69·06
1896.....	3,205,343	67·06	1926.....	22,371,924	62·11
1901.....	5,539,192	58·95	1927.....	22,736,698	56·37
1906.....	8,473,379	66·79	1928.....	21,936,407	58·18
1910*.....	32,869,264	53·49	1929.....	23,143,261	52·99
1911.....	32,559,044	53·30	1930.....	26,443,823	38·15
1916.....	25,459,741	65·66	1931.....	20,562,247	29·87
1919.....	16,020,657	(a)111·122	1932.....	18,347,907	31·67
1920.....	13,330,357	100·90	1933.....	15,187,950	37·83

*Year of maximum output.

(a) Highest price per ounce recorded since 1887.

From 1887 to 1933 inclusive the silver production in Canada amounted to 663,936,087 fine ounces valued at \$398,507,972.

For a complete record of annual productions see previous reports.

Table 69.—Production of Silver by Principal Silver-producing Provinces, 1924-1933

(For the years 1887 to 1923 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		Manitoba		British Columbia		Yukon Territory	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
1924.....	83,814	\$ 55,972	11,272,567	\$ 7,527,933	140	\$ 93	8,153,003	\$ 5,444,657	226,755	\$ 151,429
1925.....	214,943	148,451	10,529,131	7,271,944	477	329	8,579,458	5,925,403	904,893	624,964
1926.....	375,986	233,513	9,274,965	5,760,402	18	11	10,625,816	6,599,376	2,095,027	1,301,159
1927.....	740,864	417,625	9,307,953	5,246,893	12	7	11,040,445	6,223,499	1,647,295	928,580
1928.....	908,959	528,796	7,242,601	4,213,456	1,763	1,026	10,943,367	6,366,413	2,839,633	1,651,985
1929.....	813,821	431,268	8,890,726	4,711,462	2,644	1,401	10,156,408	5,382,185	3,279,530	1,737,922
1930.....	571,164	217,922	10,205,683	3,893,876	94,653	36,114	11,825,930	4,512,065	3,746,326	1,429,373
1931.....	530,345	158,414	7,438,951	2,222,014	836,547	249,877	8,061,599	2,408,000	3,694,728	1,103,615
1932†.....	628,902	199,184	6,335,788	2,006,648	1,036,497	328,275	7,293,462	2,309,958	3,053,188	966,994
1933†.....	471,419	178,351	4,535,680	1,715,975	1,101,578	416,758	6,737,057	2,548,817	2,227,476	842,717

†Northwest Territories production included with Yukon.

For data relating to silver in mine shipments from Cobalt District and nearby camps in Ontario, see previous reports.
 In 1933, Saskatchewan was credited with 114,604 fine ounces valued at \$43,358, representing the estimated metal recovered from that part of the Flin Flon mine situated in Saskatchewan.

Table 70.—Source of Canadian Silver Production by Percentages, 1932 and 1933

	1932	1933
In silver-cobalt ores.....	28.5	20.4
*In base bullion.....	29.2	34.6
In gold ores (bullion and placer).....	2.5	3.0
In blister copper.....	15.5	19.5
In matte, copper ores and silver-lead ores exported, etc.....	24.3	22.5
	100.0	100.0

*Chiefly from silver-lead ores.

Table 71.—Comparative Copper, Silver and Lead Productions in Canada for Years Specified

Year	Total copper production, Canada	(z) Silver, Ontario	Total lead production, Canada	Total silver production, Canada
	Pounds	Fine oz.	Pounds	Fine oz.
1904.....	41,383,722	*206,875	37,531,244	3,577,526
1907.....	56,979,205	10,023,311	47,738,703	12,779,799
1911.....	55,648,011	(a)31,507,791	23,784,969	32,559,044
1915.....	100,785,150	24,746,534	46,316,450	26,625,960
1919.....	75,053,581	11,214,317	43,827,699	16,020,657
1923.....	86,881,537	10,377,846	111,234,466	18,601,744
1924.....	104,457,447	9,935,902	175,485,499	19,736,323
1925.....	111,450,518	10,707,235	253,590,578	20,228,988
1926.....	133,094,942	10,543,473	283,801,265	22,371,524
1927.....	140,147,440	8,543,513	311,423,161	22,736,698
1928.....	202,696,046	6,745,401	337,946,688	21,936,407
1929.....	248,120,760	7,781,429	326,522,566	23,143,261
1930.....	303,478,356	9,225,610	332,894,163	26,443,823
1931.....	292,304,390	5,998,482	267,342,482	20,562,247
1932.....	247,679,070	4,659,304	255,947,378	18,347,907
1933.....	299,982,448	2,803,756	266,475,191	15,187,950

(z) Shipments from silver-cobalt camps as recorded by Ontario Department of Mines—Total output from these fields 420,741,513 ounces—1904-1933 inclusive.

(a) Year of maximum production.

(*) First production.

Table 72.—Average Commercial Ratio of Silver to Gold for Each Specified Year Since 1700

(Supplied by the United States Mint)

Year—	Year—	Year—	Year—
1700.....	14-81 1885.....	19-41 1915.....	40-48
1750.....	14-55 1890.....	19-75 1920.....	20-28
1800.....	15-68 1895.....	31-60 1925.....	29-78
1850.....	15-70 1900.....	33-33 1930.....	53-74
1875.....	16-64 1905.....	33-87 1931.....	71-25
1880.....	18-05 1910.....	38-22 1932.....	73-29
		1933†.....	75-60

†Estimated on averages in Canadian funds.

Table 73.—Imports into Canada and Exports of Silver, 1932 and 1933

	1932		1933	
	Quantity	Value	Quantity	Value
	Fine oz.	\$	Fine oz.	\$
IMPORTS—				
Silver in bars, etc., unmanufactured.....		585,788		674,138
Silver, manufactures of, n.o.p., and articles consisting wholly or in part of sterling or other silverware.....		94,108		73,666
Silver and other coin except gold.....				12
Total.....		679,896		747,816
EXPORTS—				
Silver contained in ore, concentrates, etc.....	3,488,094	982,652	3,362,354	1,093,464
Silver bullion.....	13,504,060	3,978,438	10,738,729	3,759,387
Total.....	16,992,154	4,961,090	14,101,083	4,852,851
Silver coin, Foreign.....		808,695		275,007
Silver coin, Canadian.....		86,689		62,943

Table 74.—Monthly Average Prices of Silver, 1931-1933

(From the *Engineering and Mining Journal*)

Month	New York (Cents per fine ounce) ·999 fine			London Spot (Pence per standard ounce) ·925 fine		
	1931	1932	1933	1931	1932	1933
January.....	29-423	29-780	25-400	13-810	19-623	16-883
February.....	26-773	30-136	26-074	12-432	19-573	16-885
March.....	29-192	29-810	27-928	13-524	18-336	17-588
April.....	28-279	28-298	30-730	13-120	16-923	18-440
May.....	27-650	27-755	34-072	12-858	16-868	19-046
June.....	27-250	27-466	35-663	12-707	16-844	19-078
July.....	28-255	26-700	37-630	13-197	16-930	18-341
August.....	27-524	27-956	36-074	12-815	18-000	17-877
September.....	28-180	27-870	38-440	14-101	17-998	18-272
October.....	29-638	27-195	38-190	17-153	17-813	18-221
November.....	32-223	26-698	41-974	19-393	18-099	18-428
December.....	30-120	25-010	43-550	20-023	17-110	18-674
Average.....	28-700	27-892	34-727	14-594	17-843	18-144

Using the par of exchange in New York for the first 9 months of 1931 and the average monthly rate of exchange for each of the last three months, the average value of silver in Canadian funds for the year was 29·87 cents per fine ounce. The average yearly price of silver in Canadian funds during 1932, computed from daily New York quotations was 31·67163 cents per troy ounce.

The average price of silver in Canadian funds based on the New York market in 1933 was 37·8328 cents per fine ounce.

World Production.—The principal silver producing countries of the world are Mexico, the United States, Canada, Australia, India and Peru. The total world output for 1933, as computed by the American Bureau of Metal Statistics, was 164,699,846 fine ounces as against 169,282,093 in 1932.

Table 75.—Comparative Figures of Silver Production, for the World, Mexico, the United States, Peru and Canada, 1924-1933

Year	World's Output*	Mexico's Output*	United States' Output*	Peru's Output*	Canada's Output
	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1924.....	239,484,703	91,486,136	65,366,840	18,717,087	19,736,323
1925.....	245,213,993	92,885,465	66,106,922	19,917,439	20,228,985
1926.....	253,795,166	98,291,166	62,672,953	21,499,798	22,371,924
1927.....	251,096,555	104,573,919	60,394,199	18,295,408	22,736,698
1928.....	257,925,154	108,537,307	58,426,004	21,607,693	21,936,407
1929.....	260,970,029	108,871,442	61,233,321	21,495,169	23,143,261
1930†.....	247,000,000	105,204,059	47,724,903	14,372,593	26,443,823
1931.....	197,000,000	86,064,437	29,856,628	8,794,407	20,562,247
1932.....	168,000,000	69,303,119	22,739,681	6,782,878	18,347,907
1933.....	171,000,000	68,101,062	23,130,596	6,760,534	15,187,950

*Prior to 1930 from Annual report of the "Director of the Mint," Washington.

†Beginning with 1930 figures from the *Imperial Institute*.

NOTE.—For years 1898 to 1923 see previous reports.

Table 76.—World Production of Silver Ore, 1931-1933

(In terms of metal)

(Supplied by Imperial Institute)

(Fine ounces)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—			
United Kingdom.....	33,989	16,043	37,553	Belgian Congo.....	2,431,569	1,887,687	2,646,650
Bechuanaland Protec- torate.....	662	1,676	622	Sweden.....	362,491	668,849	928,203
Gold Coast (estimated).....	8,900	9,000	10,500	Algeria.....	258,000	34,561	1,768
Kenya.....	288	(a)	(a)	Morocco.....	29,164	10,330	6,870
Nigeria.....	251,855	85,368	117,480	Mozambique.....	60	257	(a)
Northern Rhodesia.....	589	339	25	Tunis.....	60,764	5,859	(a)
Southern Rhodesia.....	75,960	114,555	112,434	Mexico.....	86,064,457	69,303,119	68,101,062
South West Africa (d).....	639,000	165,000	(a)	United States.....	29,856,628	22,739,681	23,130,596
Tanganyika Territory.....	1,691	3,313	(a)	Costa Rica (c).....	300	143,500	26
Union of South Africa.....	1,063,050	1,120,668	1,065,011	Guatemala (c).....	3,689,791	3,697,017	3,911,686
Canada.....	20,562,247	18,347,907	15,187,950	Nicaragua (c).....	36,485	55,375	20,859
British Guiana (estim- ated).....	1,340	1,830	3,070	Panama.....	2,800	(a)	(a)
India.....	5,923,005	6,026,737	6,080,241	Salvador (c).....	58	4,822	174
Federated Malay States (estimated).....	2,600	2,400	2,600	Argentina (b).....	15,000	15,000	(a)
Australia.....	6,730,227	9,460,369	10,817,162	Bolivia (exports).....	5,772,307	4,115,232	5,469,069
New Zealand.....	434,822	562,792	430,492	Brazil.....	32,761	21,058	(a)
Newfoundland.....	963,695	1,333,998	1,208,280	Chile.....	288,341	73,422	255,078
Total.....	37,000,000	37,000,000	35,000,000	Colombia (estimated).....	66,000	84,000	(a)
FOREIGN COUNTRIES				Ecuador.....	104,762	114,167	(a)
Austria.....	82,626	18,785	39,062	Guiana (French and Dutch).....	4,700	4,200	(a)
Czechoslovakia.....	1,231,778	1,059,969	980,716	Peru.....	8,794,407	6,782,878	6,760,534
France.....	519,544	409,913	500,000	Venezuela (b).....	4,800	6,000	(a)
Germany.....	5,784,589	5,993,499	6,320,700	China.....	128,000	134,000	122,000
Greece.....	132,081	137,783	(a)	Formosa.....	(a)	174,100	(a)
Italy.....	438,117	394,304	(a)	French Indo-China.....	4,500	5,200,555	5,967,370
Yugoslavia.....	1,643,800	2,018,100	3,926,000	Japan.....	5,387,802	620,000	750,000
Norway.....	308,645	314,781	252,493	Korea.....	390,000	842,365	860,462
Poland.....	365,104	(a)	(a)	Netherlands East In- dies.....	1,472,991	155,457	186,563
Roumania.....	114,261	186,727	326,964	Turkey.....	97,100	160,184	(a)
Hungary.....	6,609	12,814	19,186	Philippine Islands.....	97,100	160,184	(a)
Spain.....	3,098,713	3,374,335	2,929,508	Total*.....	160,000,000	131,000,000	136,000,000
				World's Total*	197,000,000	168,000,000	171,000,000

* Excluding the production of U.S.S.R. (Russia), figures for which are not available.

(a) Information not available.

(b) Estimates of United States mint.

(c) Imported into the United States from the country indicated.

Table 77.—World Silver Consumption; Production and Other Supplies(*), 1932 and 1933

(In millions of fine ounces)

Consumption	1933	1932	Production and supplies	1933	1932
China (including Hong Kong)— Excess of imports over exports.....		40	United States.....	21.4	24
India— Excess of production plus imports over exports.....	10	12	Mexico.....	69.1	69.6
Germany— Excess of production plus imports over exports.....	14.5	22.8	Canada.....	15.4	18.3
Coinage— Mexico.....	16	24.6	South America.....	13.5	12.8
Germany.....	308,645	20	All other countries.....	43.6	39
Cuba.....	7	2.8	Total Production.....	163	163.7
Yugoslavia.....	186,727	5	OTHER SUPPLIES:—		
Belgium.....	7	4.5	Demonetized coin—		
Turkey.....	4.5		Indo-China.....		10
United States— a/c war debt payments.....	22.7	1.2	Near East.....		1
Subsidiary coinage.....	2		Russia.....	45	12.1
Arts and Industries.....			Sales by Indian Government— a/c British war debt.....	20	24
In the United States and Canada.....	24	22	Sales by China, excess of exports over imports.....	15	
In England.....	8	8	Total Production and Sup- plies.....	273	210.8
In Mexico.....	1	1			
Unaccounted for.....	163.3	55.9			
Total.....	273	210.8			

* Supplied by Handy and Harman, New York.

Table 78.—World's Monetary Stocks of Silver at the Close of 1932

(Supplied by the United States Mint and subject to revision)

(Stated in United States money, 000's omitted)

Country	Silver stock in banks and treasuries	Per capita
	\$	\$
United States.....	846,702	6.76
Canada.....	28,398	2.73 (6)
Mexico.....	11,436	.69 (7)
Chile.....	2,709	.62 (6)
Colombia.....	13,189	1.57 (16) (6)
Peru.....	6,329	1.01 (6) (16)
Austria.....	10,069	1.49 (6)
Belgium.....	9,483	1.17 (16)
France.....	52,480	1.25 (16)
Germany.....	356,168	5.51 (6)
Great Britain.....	256,540	5.55 (6)
Greece.....	3,965	.62 (6)
Irish Free State.....	4,889	1.65 (6)
Italy.....	86,488	2.10 (6) (7)
Latvia.....	8,299	4.32 (6)
Netherlands.....	54,558	6.79 (6)
Norway.....	6,673	2.37 (6) (7)
Poland.....	29,304	.91 (6)
Roumania.....	6,828	.37
Russia (Soviet Union).....	11,733	.07 (7) (29)
Spain.....	116,026	4.85
Yugoslavia.....	7,378	.53 (6)
Ceylon.....	9,946	1.87 (6)
China (17).....	359,788	.77 (19)
India—British.....	1,411,330	3.99 (6)
Indo-China—French.....	6,805	.32 (7) (30)
Iraq (Mesopotamia) (7).....	25,009	7.58 (6)
Japan (including Chosen, Taiwan, Kwantung) (17).....	36,632	.41
Netherlands East Indies.....	18,534	.30
Philippine Islands.....	18,837	1.51 (6)
Siam.....	54,170	4.63 (6)
Straits Settlements.....	21,371	19.18 (6)
Egypt.....	20,551	1.39 (6)
Ethiopia.....	9,332	.93 (6)
Kenya and Uganda (14).....	14,348	2.19 (6)
Sudan-Anglo Egyptian.....	8,771	1.56 (6)
Union of South Africa.....	12,400	1.53 (6)
Australia.....	11,674	1.78 (16)
New Zealand.....	1,777	1.16
Others.....	87,547	.....
Total.....	4,058,457	2.05

NOTE.—The amount of silver in circulation in many countries is not obtainable, and in some countries that held by private banks cannot be given.

(6) Estimated silver circulation included.

(7) Prior year's figures.

(14) June 30, 1932.

(16) Includes base metal coin.

(17) Incomplete.

(19) Dollar coins circulating estimated at 1,660,000,000.

(29) Includes platinum.

(30) Total metallic divided between gold and silver.

LEAD

CANADA

Canada's lead production includes (a) lead contained in ores and concentrates exported, less deductions for smelter losses, valued at the average price in London for the year; (b) the lead contained in the base bullion made by the Consolidated Mining and Smelting Company, Ltd., at Trail, B.C., and the lead in a silver-lead-bismuth bullion produced at the Deloro smelter in Ontario, valued at the average price in London for the year.

Production in 1933 included lead from the O'Brien mine in Ontario, from the Sullivan mine in East Kootenay, British Columbia, and from several other properties producing in the Slocan, Portland canal and other districts of the same province. Important quantities of lead were contained in silver-lead concentrates exported from the Yukon by the Treadwell-Yukon Mining Company.

Previous to 1904, lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces to a base bullion which was exported for refining. A lead refinery employing the Betts electrolytic process has been in operation at Trail, B.C., since 1904; this refinery treats

the product from the Consolidated Mining and Smelting Company's blast furnaces. A great advance in 1931 at Trail was made in the lead smelting plant through the operation of the new slag-fuming installation. This plant has produced and can continue to produce 23 per cent more zinc and 4 per cent more lead from the same ore than was formerly possible.

Canadian lead production during 1933 represented a 4.1 per cent increase over that of the preceding year. This was accounted for solely through the expanding output in British Columbia. Decreases for the corresponding periods were recorded for both the Yukon and Ontario. Of the total Canadian production, British Columbia contributed 98.8 per cent. World production in 1933 based on data supplied by the American Bureau of Metal Statistics was 31.6 per cent under the high of 1929 but attained a 2 per cent increase over 1932. World's consumption of lead recorded a gain in 1933 of approximately 9.5 per cent over that of the previous year.

Early in 1934 "The Mining Journal," London, reported that no efforts had been made during 1933 to reform the "Lead Pool" which broke down in March, 1932, although co-operation was advocated; no big increase of lead can be looked for at the present time and the Journal states that world consumption appears only sufficient to take up the present production and that the huge accumulation of stocks will continue to depress the market price until world trade improves.

Important quantities of lead are consumed in the storage battery, cable and pigments industries; The American Bureau of Metal Statistics shows the use of lead in the United States in 1933 by percentages as follows: cable covering, 7.05 per cent; storage batteries, 33.43 per cent; white lead, 13.44 per cent; building, 5.91 per cent; ammunition, 7.35 per cent; red lead and litharge, 4.32 per cent; foil, 5.12 per cent; and the balance in solder, bearing metals, etc.

Table 79.—Production of Lead from Canadian Ores, 1924-1933

Year	Pounds	Value	Price per pound in cents*	Year	Pounds	Value	Price per pound in cents*
		\$				\$	
1924.....	175,485,499	14,221,345	8.104	1929.....	326,522,566	16,544,248	5.054
1925†.....	253,590,578	23,127,460	9.120	1930.....	332,894,163	13,102,635	3.927
1926.....	283,801,265	19,240,661	6.751	1931.....	267,342,482	7,260,183	2.710
1927.....	311,423,161	16,477,139	5.256	1932.....	255,947,378	5,409,704	2.114
1928 (a).....	337,946,688	15,553,231	4.576	1933.....	266,475,191	6,372,998	2.392

The data given represent the quantity of lead produced in Canada from domestic ores, together with the estimated lead recovery from lead ores and concentrates exported.

NOTE.—For years 1887 to 1923 see previous reports.

*In Canadian funds.

†Year of maximum value of Canadian lead production.

(a) Year of maximum output of Canadian lead.

Table 80.—Production of Lead from Canadian Ores, by Provinces, 1924-1933

(For years 1887 to 1923 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		British Columbia		Yukon	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$		\$
1924.....	1,058,983	85,820	5,055,368	409,687	168,467,628	13,652,617	903,520	73,221
1925.....	2,051,100	187,060	7,209,534	657,510	242,454,502	22,111,850	1,875,442	171,040
1926.....	3,729,636	251,788	7,398,795	580,730	266,812,461	18,012,509	5,860,373	395,634
1927.....	6,496,577	341,461	7,990,709	528,729	292,770,544	15,388,020	4,165,331	218,920
1928.....	6,218,336	284,520	6,814,757	402,289	317,722,146	14,537,377	7,191,449	329,045
1929.....	5,358,304	270,616	4,769,506	294,431	307,999,153	15,555,189	8,395,603	424,012
1930.....			2,193,856	116,034	321,803,725	12,637,232	8,896,582	349,369
1931.....			985,633	41,647	261,902,236	7,097,812	4,454,613	120,724
1932.....			86,477	1,828	252,007,574	5,326,432	3,853,327	81,444
1933.....			29,910	692	263,345,776	6,298,178	3,099,505	74,128

Production of lead from Canadian ores from 1887 to 1933 inclusive totals 4,086,061,539 pounds valued at \$208,073,251.

Table 81.—Refined Lead Produced in Canada,* 1924-1933

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1924.....	130,471,208	1929.....	304,449,673
1925.....	213,217,605	1930.....	304,471,706
1926.....	257,273,585	1931.....	278,448,457
1927.....	295,766,327	1932.....	253,136,522
1928.....	301,067,819	1933.....	254,565,861

*Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C.; and also the pig lead from Galetta, Ont., until 1931.

NOTE.—For years 1904 to 1923 see previous reports.

Table 82.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1931-1933

Industries	Items (Used)	1931	1932	1933
		Pounds	Pounds	Pounds
Paints and Pigments.....	Pig lead.....	14,582,000	11,415,000	10,772,000
White Metal Alloys.....	Pig lead.....	12,395,000	6,362,000	7,129,000
White Metal Alloys.....	Scrap lead.....	5,007,000	3,119,000	2,164,000
Electrical Apparatus.....	Pig lead.....	15,292,000	12,108,000	9,480,000
Electrical Apparatus.....	Scrap lead.....	177,000	132,000	185,000
Electrical Apparatus.....	Lead sheets.....	447,000	34,000	12,000
Electrical Apparatus.....	Other lead.....			601,000
Iron and Steel.....	Lead.....	773,000	633,000	1,073,000
Grand Total.....		48,673,000	33,803,000	31,416,000

Table 83.—Imports into Canada and Exports of Lead, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$	Pounds	\$
IMPORTS—						
Old and scrap, pig and block.....	256,978	8,749	28,398	1,436	15,038	1,148
Bars and sheets.....	539,654	24,535	159,026	6,893	88,607	3,820
Litharge.....	3,866,100	232,280	2,284,700	125,385	1,885,300	100,816
Acetate of lead not ground.....	102,955	9,146	124,169	8,195	102,747	7,897
Nitrate of lead not ground.....	102,461	6,183	160,483	9,693	40,385	2,120
Other manufactures, n.o.p.....		162,720		129,629		63,723
Pipe lead.....	127,525	5,750	31,006	1,350	10,686	658
Shots and bullets.....	8,699	791	7,480	650	5,327	340
Tea lead.....	17,780	1,275			200	12
Lead arsenate.....	1,248,460	116,996	830,120	80,488	498,673	44,256
Lead tetraethyl, compounds of.....	1,205,305	1,363,269	1,525,825	1,517,639	1,571,775	1,212,990
Lead pigments—						
Dry white lead.....	95,470	7,084	8,412	629	8,880	599
White lead, ground in oil.....	53,119	4,736	13,632	1,174	21,250	2,540
Dry red lead and orange mineral.....	1,491,320	98,103	620,520	38,065	611,696	32,596
Total.....		2,041,617		1,921,226		1,473,515
EXPORTS—						
Lead in ore.....	4,421,700	176,964	3,713,300	148,518	7,600,000	267,805
Pig lead, refined lead, etc.—						
To United Kingdom.....	95,712,200	1,989,432	121,478,800	1,849,717	172,317,900	3,040,071
United States.....					336,000	7,156
France.....	21,786,300	454,413	6,647,700	122,441		
Japan.....	56,550,500	1,160,920	54,627,100	844,695	72,955,200	1,190,362
Netherlands.....	5,777,100	119,302	10,682,600	152,151	4,984,200	94,113
China.....	7,026,700	141,077	5,368,300	80,129	7,760,500	125,098
Brazil.....	1,646,300	32,243	4,648,900	68,865	4,099,200	70,608
Germany.....	15,766,000	335,917	2,857,900	42,951	7,468,600	132,652
Other countries.....	12,160,700	249,508	7,679,400	108,172	14,407,800	262,454
Total Pig Lead.....	216,425,800	4,482,812	213,990,700	3,269,121	284,329,400	4,922,514
Total Lead Exports.....	220,847,500	4,659,776	217,704,000	3,417,639	291,929,400	5,190,319

Table 84.—Monthly Average Prices of Pig Lead, Montreal,* New York and London,†
1931-1933

Month	Montreal (Value in cents per pound)			New York (Value in cents per pound)			London† (Value in pounds sterling per long ton)		
	1931	1932	1933	1931	1932	1933	1931	1932	1933
January.....	4.640	4.260	3.262	4.802	3.750	3.000	13.872	15.084	10.458
February.....	4.530	4.148	3.400	4.552	3.712	3.000	13.444	14.560	10.431
March.....	4.510	3.850	3.459	4.527	3.150	3.146	13.128	12.345	10.609
April.....	4.250	3.609	3.416	4.412	3.000	3.260	12.375	11.223	10.872
May.....	3.930	3.320	3.636	3.818	3.000	3.654	11.491	10.673	12.095
June.....	3.920	3.145	3.933	3.917	2.993	4.173	11.582	9.608	13.280
July.....	4.135	3.088	4.174	4.400	2.747	4.452	12.731	9.818	13.411
August.....	3.964	3.217	3.889	4.400	3.235	4.500	11.944	11.349	12.182
September.....	3.800	3.482	3.848	4.400	3.465	4.500	11.932	13.122	11.932
October.....	3.905	3.264	3.688	3.964	3.052	4.313	13.227	11.958	11.804
November.....	4.162	3.373	3.848	3.937	3.050	4.288	14.577	12.071	11.537
December.....	4.268	3.386	3.903	3.792	3.000	4.141	15.188	11.144	11.431
Average.....	4.168	3.511	3.705	4.243	3.180	3.869	12.958	11.913	11.670

*Producers' prices for car load quantities ex-cars Montreal, as furnished by the Consolidated Mining and Smelting Company.

†From the *Engineering and Mining Journal*.

‡In 1931 using the par of exchange in London for the first 9 months and the average monthly rate of exchange for each of the remaining three months the average value of lead for the year in Canadian funds was 2.7101 cents per pound.

The average price of lead for 1932, based on daily quotations in London and transposed to Canadian funds, was 2.1136 cents per pound, the average price of lead, based on the same market, was 2.3916 cents per pound for 1933.

Table 85.—World Production of Lead Ore, 1931-1933

(In terms of metal)
(Supplied by *Imperial Institute*)
(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES —Con.			
United Kingdom.....	23,602	32,913	39,735	Norway.....	867	844	806
Nigeria (estimated)...	1,310	440	636	Poland.....	8,000	5,000	5,000
N. Rhodesia.....			73	Portugal.....	40	101	209
S.W. Africa (b).....	14,100	5,000		Roumania.....		2,803	3,131
Union of S. Africa.....	39	68	86	U.S.S.R.....	15,800	(d) 16,000	(d) 20,000
Canada (c).....	119,349	114,262	118,962	Spain (smelters).....	107,899	103,706	82,175
Newfoundland.....	24,971	35,593	34,374	Sweden.....	8,237	7,193	7,401
India.....	89,000	78,800	96,100	Algeria.....	5,600	1,566	56
Australia.....	150,764	210,566	221,889	Morocco.....	1,470	2,665	642
Total.....	420,000	480,000	510,000	Tunis.....	13,418	6,289	3,700
FOREIGN COUNTRIES				Mexico (c).....	223,199	135,231	116,818
Guatemala.....	166	164	(a)	United States (c)....	361,270	261,579	243,902
Austria.....	1,646	4,735	6,209	Argentina.....	3,738	2,748	(a)
Czechoslovakia.....	4,604	4,171	3,830	Bolivia (exports)....	6,564	5,402	7,721
Finland.....		150	(a)	Brazil.....	800	500	150
France.....	6,958	3,169	4,000	Chile.....	(a)	(a)	32
Germany.....	53,404	50,145	52,813	Peru.....	3,438	1,146	1,200
Greece.....	6,043	6,821	8,100	China.....	3,511	3,136	3,156
Hungary.....	51		10	French Indo-China..	6		
Italy.....	23,727	21,273	18,000	Japan (smelter).....	4,006	6,313	6,717
Yugoslavia.....	32,584	48,681	60,146	Turkey.....	2,161		2,200
				Total.....	900,000	700,000	660,000
				World's Total....	1,320,000	1,180,000	1,170,000

(a) Information not available.

(b) Years ended March 31 of the year following that stated.

(c) Amount estimated as recoverable.

(d) Estimated.

Table 86.—World Metal Production of Lead, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	10,554	7,000	5,500	—con.			
S.W. Africa (d).....	2,599	1,028	402	Portugal.....	106	107	68
Canada.....	124,307	113,007	113,645	Roumania.....	1,293	1,907	4,018
India.....	74,785	71,202	72,045	U.S.S.R. (Russia)			
Australia (e).....	150,436	186,356	205,264	(f).....	15,200	18,500	13,500
N. Rhodesia.....			73	Spain.....	107,899	103,706	86,959
Total.....	363,000	379,000	397,000	Sweden.....	24	38	
FOREIGN COUNTRIES				Tunis.....	18,810	13,860	14,638
Austria.....	6,020	1,955	4,552	Mexico.....	173,977	135,157	117,700
Belgium (b).....	69,731	63,147	64,000	United States.....	371,297	248,918	245,998
Czechoslovakia.....	3,601	4,059	3,751	Argentina.....	7,493	9,100	11,900
France.....	29,858	12,000	7,600	Peru.....	2,601	4,391	1,198
Germany (c).....	118,420	104,731	130,000	French Indo-China..	6	16	18
Greece.....	6,601	6,380	8,100	Brazil (estimated)...	700	(a)	(a)
Hungary.....	51		10	Japan.....	4,006	6,313	6,717
Italy.....	24,489	30,974	24,365	Korea.....	93	485	771
Yugoslavia.....	7,804	8,190	6,219	Turkey.....	1,204		
Norway.....	342	428	359	Total.....	1,000,000	790,000	760,000
Poland.....	31,372	11,714	11,845	World's Total...	1,369,000	1,170,000	1,160,000

(a) Information not available.

(b) Includes base bullion as follows:—

1931..... 13,582 long tons.

1932..... 6,476 “

(c) Includes some secondary. Figures as published by metallgesellschaft, which exclude secondary, are:—

1931..... 99,700 long tons.

1932..... 93,700 “

1933..... 114,800 “

(d) Years ended March 31 of the year following that stated.

(e) Includes base bullion as follows:—

1931..... 17,130 long tons.

1932..... 51,857 “

1933..... 45,871 “

(f) Metallgesellschaft figures.

ZINC

Refined zinc is produced at Trail, British Columbia, by the Consolidated Mining and Smelting Company, Limited, from ores mined chiefly in British Columbia; in 1930 a new electrolytic zinc refinery was brought into production at Flin Flon, Manitoba, by the Hudson Bay Mining and Smelting Company, Limited; the plants of both of these companies were in continuous operation throughout 1933.

No primary zinc was produced in 1933 in Nova Scotia, Quebec or Ontario. The Manitoba and Saskatchewan output came entirely from ores treated at the Flin Flon plants while in British Columbia some of the principal producers of zinc ores in the order of their output were the Sullivan, Monarch, Britannia, Highland Lass and Wellington.

Figures for the total Canadian production of zinc are compiled by adding the quantities of refined zinc made at Trail and Flin Flon to the amount of zinc estimated as recoverable from ores and concentrates exported; the value of production is usually calculated at the monthly average price for zinc on the London market for the year, expressed in Canadian funds. In 1933, using the average monthly rate of exchange, the average value of zinc for the year in Canadian funds was 3.21 cents per pound.

Production of zinc in Canada during 1933 was 15.6 per cent greater than in 1932. Of the total production of the Dominion, British Columbia contributed 76.7 per cent; Saskatchewan, 1.4 per cent, and Manitoba, 21.9 per cent. Primary zinc was not produced in 1933 in any of the other provinces. World production showed an increase of 26.3 per cent over 1932 but was still 31.9 per cent under that of 1929. World consumption was up 23.3 per cent over the preceding year; it was, however, 31.4 per cent under 1929.

Early in 1934 the Mining Journal, London, in a review on the zinc situation reports as follows: "On the whole, the zinc industry may be said to have taken a definite step forward during 1933, although there have been no very outstanding features. The price of the metal was affected mostly by outside influences such as the American situation, and reacted quickly to any change in general economic sentiment. Greater stability might be reached if a longer period for the continuation of the cartel could be arranged, as the continued rumours as to its internal difficulties and the possibility of its break up have had a disturbing influence."

The United States Bureau of Mines states that sales of all lead pigments and of all zinc pigments and salts registered important increases in the United States during 1933; the increases in sales of zinc pigments and salts in comparison with 1932 showed the following increases: leaded zinc oxide, 60 per cent; zinc oxide, 36 per cent; lithopone, 16 per cent; zinc chloride, 37 per cent, and zinc sulphate, 34 per cent.

It has recently been announced that lubricants containing zinc oxide in colloidal form have been produced. The presence of the zinc oxide makes the lubricant anodic to steel and creates an electrolytic couple which forms an adherent film on the contacting surface. The zinc is described as plating out and penetrating the surface layers of the steel, producing a hard corrosion-resisting skin and it is claimed that should this ultra-microscopical thickness be reduced owing to wear taking place due to slip, it is automatically built up again.

The American Bureau of Metal Statistics reports the following as the estimated manufacture of zinc by percentage in the United States during 1922, 1932 and 1933:—

	1922	1932	1933
Galvanizing.....	46.69	42.08	42.25
Brass making.....	32.97	25.48	26.83
Rolled zinc.....	12.16	15.45	11.79
Die castings.....	(a)	6.56	7.42
Other purposes.....	8.18	10.43	11.71
Total.....	100.00	100.00	100.00

(a) Included in "other purposes."

Table 87.—Production of Zinc from Canadian Ores, by Provinces, 1924-1933

(For years 1898 to 1923, see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		Manitoba		British Columbia		Canada	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$		\$		\$
1924.....	2,909,008	184,547					96,000,069	6,090,244	98,909,077	6,274,791
1925.....	9,936,000	757,322	179,545	13,685			99,152,966	7,557,439	109,268,511	8,328,446
1926.....	12,904,176	956,199					137,033,929	10,154,214	149,938,105	11,110,413
1927.....	17,189,046	1,064,690					148,306,479	9,186,103	165,495,525	10,250,793
1928.....	21,057,760	1,156,745	58,724	3,226			163,530,890	8,983,079	184,647,374	10,143,050
1929.....	19,653,440	1,058,731	5,516,806	297,190			172,096,841	9,270,857	197,267,087	10,626,778
1930.....	9,754,160	351,150	3,527,894	127,004						
1931.....					3,832,141	139,757	250,479,310	9,017,255	267,643,505	9,635,166
1932.....					35,173,749	898,338	202,071,702	5,160,911	237,245,451	6,059,249
1933.....					41,736,600	1,004,016	130,546,958	3,140,438	172,283,558	4,144,454
1933*.....					43,516,037	1,397,082	152,826,264	4,906,487	199,131,984	6,593,132

*Included in the Canada total is a production of 2,789,683 pounds valued at \$89,563, representing zinc mined in that part of the Flin Flon mine located in Saskatchewan.

Table 88.—Production of Refined Zinc in Canada, 1924-1933

Year	Short tons	Year	Short tons
1924.....	27,444	1929.....	86,048
1925.....	38,462	1930.....	121,496
1926.....	61,727	1931.....	118,622
1927.....	73,208	1932.....	86,141
1928.....	81,765	1933.....	91,946

NOTE.—For years 1916 to 1923, see previous reports.

Table 89.—Available Statistics on the Consumption of Zinc in Specified Canadian Manufacturing Industries, 1931-1933

Industries	Items (Used)	1931	1932	1933
		Pounds	Pounds	Pounds
Brass and copper products.....	Zinc ingots and bars.....	2,493,000	2,110,000	3,570,000
Brass and copper products.....	Zinc, other.....	84,000	301,000	237,000
Brass and copper products.....	Zinc scrap.....	39,000	64,000	21,000
White metal alloys.....	Zinc spelter.....	301,000	382,000	401,000
White metal alloys.....	Scrap zinc.....	277,000	485,000	397,000
Electrical apparatus.....	Zinc ingots and bars.....	1,586,000	577,000	284,000
Electrical apparatus.....	Zinc sheets.....	1,275,000	1,143,000	1,492,000
Iron and steel.....	Zinc.....	19,208,000	16,783,000	16,400,000
Grand Total.....		25,263,000	21,845,000	22,812,000

Table 90.—Imports into Canada and Exports of Zinc, 1931-1933

	1931		1932		1933	
	Pounds	Value	Pounds	Value	Pounds	Value
IMPORTS		\$		\$		\$
Zinc and Zinc Products—						
Zinc, in blocks, pigs, bars and rods and zinc plates, n.o.p.....	403,205	12,798	123,476	3,248	16,400	1,074
Zinc, in sheets and strips and zinc plates for marine boilers.....	4,138,436	283,261	4,070,523	273,359	3,969,100	273,439
Zinc, as spelter.....	22,376	1,073	66,476	1,897	162,300	4,921
Zinc white (zinc oxide).....	11,483,357	641,570	10,112,476	456,861	9,864,697	428,201
Zinc dust.....	403,001	28,783	530,628	40,623	841,400	47,826
Zinc sulphate and chloride of (a).....	2,242,204	77,278	336,685	10,907	.....	.....
Zinc sulphate*.....	.....	.....	719,923	14,628	432,604	7,902
Zinc chloride*.....	.....	.....	1,456,036	50,630	1,018,954	30,971
Zinc, manufactures of, n.o.p.....	.....	122,131	.....	80,261	.....	72,499
Lithopone.....	13,862,914	560,037	16,110,700	589,148	11,387,409	406,598
Total.....		1,726,931		1,517,562		1,273,431
EXPORTS						
Zinc, contained in ore—						
To Belgium.....	.....	.....	.....	.....	6,071,600	121,241
Japan.....	.....	.....	.....	.....	2,254,000	14,008
Total.....					8,325,600	135,249
Zinc, scrap, dross and ashes—						
To United Kingdom.....	216,600	3,149	541,100	7,154	826,800	12,549
United States.....	438,000	3,651	2,200	71	511,900	2,933
Japan.....	72,300	1,340	39,100	617	2,911,900	18,220
Other countries.....	366,200	1,878	245,500	1,680	2,051,500	13,358
Total.....	1,093,100	10,018	827,900	9,522	6,302,100	47,060
Zinc, spelter—						
To United Kingdom.....	148,752,900	3,445,204	102,486,200	2,270,405	117,820,500	3,414,465
United States.....	.....	.....	.....	.....	56,000	2,156
British India.....	6,432,300	152,025	8,692,900	182,415	4,161,200	101,616
Argentina.....	3,270,500	71,571	2,117,400	44,489	2,354,800	68,294
Belgium.....	7,482,600	180,486	6,664,100	141,935	12,209,500	352,354
Brazil.....	(b).....	.....	795,600	18,904	347,400	8,548
China.....	1,889,900	40,220	1,366,200	28,242	2,940,400	90,002
France.....	15,269,900	383,660	9,942,100	224,684	1,691,800	49,739
Germany.....	16,693,900	413,071	4,862,000	115,141	2,866,300	77,726
Italy.....	(b).....	.....	1,120,400	25,702	1,120,400	26,665
Japan.....	27,741,100	617,779	30,475,100	644,712	25,761,500	740,398
Netherlands.....	9,745,800	231,279	5,668,600	128,406	1,691,900	47,101
Sweden.....	(b).....	.....	672,200	18,677	.....	.....
Other countries.....	739,100	19,216	459,000	9,278	431,700	11,641
Total.....	238,018,000	5,554,511	175,321,800	3,852,990	173,453,400	4,990,705
Grand Total—Exports.....		5,564,529		3,862,512		5,173,014

* From April 1 to December 31, 1932.

(a) From January 1 to March 31, 1932.

(b) Included with other countries.

Table 91.—Monthly Average Prices of Zinc at Montreal, St. Louis and London, 1931-1933

Month	Montreal ¹ (In cents per pound)			St. Louis ² (In cents per pound)			London ² (In pounds Sterling per long ton)		
	1931	1932	1933	1931	1932	1933	1931	1932	1933
January.....	4.360	4.063	3.924	4.035	3.011	3.018	12.747	14.416	14.381
February.....	4.230	3.936	3.983	4.012	2.817	2.666	12.303	13.872	13.866
March.....	4.220	3.820	4.152	4.002	2.787	2.987	12.190	12.616	14.647
April.....	3.960	3.634	4.139	3.717	2.725	3.298	11.353	11.670	14.951
May.....	3.660	3.564	4.294	3.306	2.532	3.805	10.484	12.432	15.505
June.....	3.800	3.480	4.637	3.416	2.777	4.348	11.270	11.548	16.988
July.....	3.978	3.355	5.095	3.893	2.537	4.878	12.280	11.592	17.795
August.....	3.786	3.561	4.809	3.817	2.758	4.916	11.444	13.594	16.869
September.....	3.707	3.802	4.802	3.744	3.322	4.699	11.571	15.455	16.810
October.....	3.750	3.667	4.657	3.377	3.027	4.748	12.733	14.869	16.310
November.....	4.014	3.834	4.643	3.209	3.094	4.520	13.845	15.264	15.048
December.....	4.068	3.971	4.720	3.149	3.124	4.461	14.361	15.209	14.826
Average.....	3.961	3.724	4.488	3.640	2.876	4.029	12.215	13.545	15.666

¹ Supplied by Consolidated Mining and Smelting Co., Montreal, Que.² From the *Engineering and Mining Journal*.

In 1931, using the par of exchange in London for the first nine months and the average monthly rate of exchange for each of the remaining three months, the average price of zinc for the year in Canadian funds was 2.554 cents per pound. The London zinc price, on the basis of which the greater part of the Canadian production is sold, when converted to Canadian funds, averaged 2.4056 cents per pound in 1932; the corresponding figure for 1933 was 3.21 cents.

Table 92.—World Metal Production of Zinc, 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—			
United Kingdom (b).....	21,241	26,875	45,000	Concluded			
Northern Rhodesia.....	6,927		18,542	Netherlands.....	19,018	15,377	18,186
Canada.....	105,913	76,912	82,095	Norway.....	38,849	38,751	44,238
Australia.....	53,832	53,200	53,956	Poland.....	128,691	83,611	81,592
Total.....	188,000	157,000	200,000	U.S.S.R. (Russia).....	9,364	14,600	16,600
FOREIGN COUNTRIES				Spain.....	9,935	9,355	8,413
Belgium.....	132,592	94,809	135,300	Sweden.....	92	140	(a)
Czechoslovakia.....	7,792	5,936	6,501	Mexico.....	35,056	29,800	26,400
France.....	56,211	48,000	54,000	United States (c).....	260,711	184,954	274,270
Germany (b) (d).....	47,853	44,182	54,000	French Indo-China.....	2,836	2,244	3,198
Italy.....	16,646	17,700	22,915	Japan.....	25,006	26,616	30,173
Yugoslavia (e).....	4,433	2,516	2,984	Total.....	790,000	620,000	780,000
				World's Total.....	930,000	780,000	930,000

(a) Information not available.

(b) Includes some secondary metal.

(c) The production by grades (including redistilled secondary) was as follows (long tons):—

	1931	1932	1933
A.—High grade.....	74,504	39,460	93,663
B.—Intermediate grade.....	21,361	11,871	24,166
C. and D.—Select and brass special.....	65,423	59,682	62,485
E.—Prime Western.....	118,730	87,082	120,820

Total secondary zinc recovered..... 91,000 63,500 (a)

(d) The figures published by Metallgesellschaft (which exclude secondary) are (long tons):—

	1931	1932	1933
	44,600	41,300	50,100

(e) Including zinc dust.

Table 93.—World Production of Zinc Ore (In terms of Metal) 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom.....	196	4	4	Poland.....	62,000	25,000	35,000
Northern Rhodesia.....	6,927		18,542	U.S.S.R. (Russia).....	20,000	(a)	(a)
Canada (shipments) (b)....	229,308	126,486	120,339	Spain.....	38,000	34,000	35,000
Newfoundland.....	43,844	65,405	73,730	Sweden.....	28,700	24,156	24,346
India.....	45,300	41,400	55,400	Algeria.....	3,602	1,845	2,252
Australia.....	74,212	115,672	123,703	French Morocco.....			195
Total.....	400,000	349,000	392,000	Tunis.....	248		
FOREIGN COUNTRIES				Mexico.....	148,155	56,308	87,928
Austria.....	686	1,585	2,070	United States.....	366,355	254,671	343,023
Belgium (c).....	4,000	3,000	3,000	Bolivia (exports).....	14,438	12,763	13,200
Czechoslovakia.....	1,362	1,592	1,337	Peru.....	85	209	55
Finland.....	(a)	740	(a)	China.....	5,611	4,427	3,989
France.....	4,281	1,200	(a)	French Indo-China.....	7,900	4,918	4,910
Germany.....	103,358	74,086	102,715	Japan (c).....	10,000	10,000	10,000
Greece.....	5,631	6,809	(a)	Turkey (estimated).....	700	1,600	4,100
Italy.....	46,345	31,674	25,000	Roumania.....	3,971	105	4,129
Yugoslavia.....	31,598	47,207	58,326	Korea.....			3,142
Norway.....	7,305	8,734	9,597	Total.....	920,000	630,000	800,000
				World's Total.....	1,320,000	980,000	1,190,000

(a) Information not available.

(b) The amount estimated as recoverable was:—

1931..... 105,913 long tons.

1932..... 76,912 “

1933..... 88,898 “

(c) Metallgesellschaft estimate.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. General Review.
2. Commodity statistics, including tables showing production by provinces, imports, exports, prices and world output of nickel, copper and metals of the platinum group.

1. General Review

(a) **Definition of the Industry.**—The nickel-copper industry in Canada includes the mining, smelting and to a certain extent the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntingdon, West Virginia, U.S.A., Kristiansand, Norway, and Clydach, Wales.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 15 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production and trade statistics on nickel, copper and the metals of the platinum group are given in this chapter.

(b) **Historical.**—Construction of railways in Canada has resulted in the discovery of some valuable mineral deposits. One of these was the finding of the nickel-copper ores of the Sudbury area during the building of the Canadian Pacific Railroad in 1883. The first of these ore bodies was mined for copper in 1886 and it was not until 1887 that the presence of nickel was detected. Almost coincident with these discoveries occurred the introduction of nickel in the manufacture of special steels. This stimulated an almost continuous growth in the industry, a growth which has firmly established Canada as the premier nickel producing nation of the world.

For many years the principal use for nickel was in the manufacture of war material, especially in armour plate; this particular consumption of the metal reached its maximum during the late World War. Following the cessation of hostilities the demand for nickel was greatly reduced and it was largely by intensive research that new uses for the metal were developed and production re-established on a firmer and broader basis. The almost universal industrial expansion of the past decade was largely responsible for the high record production of 110,275,912 pounds of nickel from Canadian mines in 1929. Production of the metal since declined, sharply reflecting the general and severe economic depression of 1930, 1931 and 1932. In 1933 there was a pronounced increase in Canadian nickel output, an increase which reflected the almost general improvement in both domestic and world industrial conditions.

(c) **Importance of Nickel, Copper and Platinum Group Metals.**—Canada supplies about 90 per cent of the world's nickel requirements, the remainder being obtained largely from New Caledonia. A small amount of nickel is recovered from the silver-cobalt ores of the Cobalt district, most of the Canadian nickel output is, however, produced from the ores of the Sudbury area.

Production of nickel in Canada in 1933 totalled 83,264,658 pounds valued at \$20,130,480 as compared with an output of 30,327,968 pounds at \$7,179,862 in 1932. The statistics relating to 1933 reveal an increase of 174.5 per cent in quantity and 180.4 per cent in value over the corresponding figures for the preceding year.

Copper produced from the nickel-copper ores in Ontario constituted about 48.5 per cent of the total copper obtained from all Canadian ores. British Columbia, mining and smelting copper and copper-gold ores, produced approximately 14.4 per cent of Canada's copper output. Quebec supplied 23.3 per cent; the Manitoba production accounted for 12.7 per cent, and Saskatchewan 1.1 per cent.

As a world producer of copper in 1933 Canada ranks third; the United States is the leading copper producing country; followed, according to importance, by Chile, Canada, Northern Rhodesia, Japan and Belgian Congo. Until within the last three years the amount of refined copper produced in Canada had been relatively small; previously it was found more profitable to ship blister copper or copper in matte or in concentrates to foreign metallurgical plants for conversion to refined metal.

During recent years Canada's new copper refineries located at Copper Cliff, Ontario, and Montreal East, Quebec, have maintained production of electrolytic copper at a most satisfactory rate and the high standard of this Canadian product is receiving ever growing recognition in the copper markets of the world.

Some gold and silver, together with metals of the platinum group, including, in addition to platinum, the associated metals, palladium, rhodium, osmium and iridium, are present in varying amounts in the ores of the Sudbury district. The amounts of these metals in the different Sudbury nickel deposits vary considerably and their recovery has been a factor of growing importance in the metallurgical treatment of the nickel ores.

At the present time Canada produces a very considerable proportion of the world's supply of platinum and palladium; recovery of most of these metals is carried out in refineries operating outside the confines of the Dominion.

It is especially noteworthy that the 1933 Canadian nickel output, after over three years of exceptionally depressed industrial conditions, represents the fifth largest annual production ever recorded for the Dominion. This ability for rapid expansion reflects not only the stability of this industry but also the high degree of efficiency developed within the two Canadian nickel mining organizations.

(d) **Mining, Smelting and Refining.**—Practically all of the nickel produced in Canada is derived from the copper-nickel bearing deposits of the Sudbury district, Ontario. Two companies operate mines and metallurgical plants in this area. The International Nickel Company of Canada, Ltd., conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treat their matte in a refinery at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Company is treated in plants located at Clydach, Wales; Huntingdon, West Virginia; at Port Colborne and Copper Cliff, Ontario.

The International Nickel Company reports that during 1933 there were shipped 1,336,040 tons of ore from the Frood and Creighton mines. The former furnished 952,725 tons and the latter, 383,315 tons. The Frood mine was operated throughout the year and mining was resumed at Creighton during June after a prolonged shut-down. Ten new stopes and eight pillar stopes were brought to the production stage in the Frood mine, thus making available for mining seventy-two stopes rated at one hundred and fifty tons each daily and eight pillar stopes rated at fifty tons daily. Operations at the company's concentrator were increased during the year, the total ore milled amounting to 996,515 tons. Improvement in metallurgy continues and is reflected in better recoveries and lower costs. Experimental process investigations and micro-photography on the occurrence of the precious metals in ores are now receiving attention. The Copper Cliff smelter produced 53,186 tons of bessemer matte and 61,385 tons of blister copper. This was the first full year of operation for the new Orford process plant and the results were so satisfactory from the standpoint of costs and quality that the wisdom of moving from Port Colborne to Copper Cliff has been proved. The Coniston smelter resumed operations in June with two blast furnaces and two converters and treated 328,640 tons of ore and produced 20,645 tons of bessemer matte.

At Port Colborne the refinery produced 41,496,664 pounds of nickel in the form of electrolytic cathodes and nickel in oxide. Operations were resumed in May when three electrolytic circuits were started, followed by two additional circuits in June and a sixth in August. All six circuits remained in operation during the balance of the year. The principle of spreading labour at Port Colborne continued and the management was able to provide work for all former married employees. As a result of the increased operations, employment conditions in the town at the close of the year were much improved.

The output of nickel at the Clydach refinery (The Mond Nickel Company, Ltd., Wales) was 20,760,117 pounds compared with 7,416,464 pounds in 1932, an increase of 180 per cent; research work was carried on throughout the year, primarily in connection with experimental refining by the high pressure carbonyl process. The average number of men employed at this refinery during the year was 722 as compared with 458 in 1932.

"Monel metal" is reported to have become an important percentage of the total output of Henry Wiggin & Co., Ltd. (a subsidiary of The Mond Nickel Co., Ltd., England), amounting in 1933 to 17 per cent. At the Huntingdon works (The International Nickel Company, W. Va., U.S.A.) "monel metal" shipments were 11 per cent in excess of 1932 and combined shipments of rolled nickel "Inconel" and special alloys showed an increase of 86 per cent.

The total number of employees of the International Nickel and subsidiary companies at the end of 1933 was 8,297, distributed as follows: Canada, 4,772; Great Britain, 2,339; United States, 1,138; other countries, 48. Employees on December 31, 1932, numbered 4,654, the increase, amounting to 78 per cent, was due in main to the increased scale of operations necessitated by the growing demand for the company's metals.

Proven ore reserves of the International Nickel Company on December 31, 1933, were 204,783,399 tons. With the resumption of mining on a substantial scale development and exploratory work must be resumed. In consequence a three-year development program for the Frood and Creighton mines has been approved.

Sales of nickel in all forms by the International Nickel Company and including nickel in alloys amounted to 74,356,969 pounds compared with 34,406,953 pounds in 1932, an increase of 116 per cent. Sales of nickel in refinery products of Port Colborne, Ontario, and Clydach, Wales, amounted to 61,353,495 pounds compared with 24,776,420 pounds in 1932, an increase of 148 per cent. Sales of nickel in products of the rolling mills at Birmingham, England; Glasgow, Scotland, and Huntingdon, West Virginia, U.S.A., and of the foundry at Bayonne, New Jersey, U.S.A., totalled 13,003,474 pounds (includes nickel contents of "monel metal," rolled nickel and alloys) as compared with corresponding sales of 9,630,533 pounds in 1932, an increase of 35 per cent.

Significant figures of accomplishment by Falconbridge Nickel Mines Ltd., during 1933 as compared with 1932 are as follows:—

	1933	1932
Tons ore broken.....	430,645	247,004
Tons ore hoisted.....	267,573	159,573
Tons broken ore reserve.....	408,780	227,321
Tons new ore developed.....	160,000	314,648
Tons total ore reserves.....	2,817,884	2,920,457
Grade of reserves—per cent nickel.....	2.23	2.25
Grade of reserves—per cent copper.....	.93	.93

The completion and inauguration of the increased plant facilities at the Falconbridge mine marked a very decided advance in practice and accomplishment. The flotation-concentrator for the lower grade high silica marginal ores, the sintering plant for agglomerating the concentrates with flue dust and mine fines, the mechanical equipment for facilitating the blast furnace smelting, all went into operation smoothly. The entire reduction plant was in operation a total of 324 days during 1933. Results of operation tabulate as follows:—

Total ore treated.....	232,661 short tons
Matte produced.....	8,297 short tons
Nickel produced in matte.....	4,671.5 short tons
Copper produced in matte.....	2,103.5 short tons
Metals per ton of ore.....	43.31 lb. nickel—19 lb. copper
Metallurgical losses per ton of ore.....	3.15 lb. nickel—1.64 lb. copper

For the year 1933 the amount of matte received at the Norwegian refinery, the refinery production, the metals in process, and the matte on hand at the end of the year, were:—

	Short tons	Contents	
		Nickel Lb.	Copper Lb.
Falconbridge matte received.....	8,281.28		
Metal content less refining losses.....		9,051,497	3,940,094
Produced in marketable form during the year.....		7,468,320	3,282,113
Metals in process at end of year.....		2,165,915	688,436
Matte on hand at end of year.....	671,859	729,638	325,180

Combined development footages, attained on all levels of the Falconbridge mine during the period reviewed, distribute as follows:—

Drifting and cross-cutting.....	3,083 feet
Raising.....	909 feet
Stope entrances.....	340 feet
Box holes.....	64 only
Diamond test drilling.....	3,071 feet

During the year shipments to consumers totalled 6,336,026 pounds of nickel and 3,405,980 pounds of copper for Falconbridge account.

In Strathy township, Temagami Forest Reserve, Ontario, Coniptau Mines Development Co. Ltd., conducted considerable development work during 1933. This included both underground and surface operations; bulk samples shipped from the deposit in 1930 were reported by the owners to contain appreciable amounts of copper, nickel, platinum and gold.

During 1933 extensive surface operations were conducted near Yale, British Columbia, by the B.C. Nickel Mines, Ltd. These consisted of seven and one-half miles of road construction, topographical surveying, installation of a hydro-electric power plant and transmission line and establishment of temporary and permanent camps. The ore deposits of this company consist of nickel-bearing pyrrhotite.

The International Nickel Company states that the world's consumption of nickel, in all forms, aggregated 96,000,000 pounds in 1933 as compared with 57,000,000 pounds in 1932 and 73,000,000 pounds in 1931, and it is remarked by this organization that if there has been any one factor more important than others in the recovery of the nickel market, it has been the increase, during 1933, in the production and sales of automotive vehicles, which has occurred in practically all industrial countries. The continued liquidation during the preceding year, to almost negligible tonnage, of nickel-bearing scrap as well as of nickel-bearing products, also contributed to the increased demand. Nickel consuming industries appear now to be operating almost wholly on the basis of newly mined nickel.

Research work was recently conducted by the Department of Mines, Ottawa, on disseminated copper-nickel ore from the Falconbridge mine. Minerals present in the polished sections of the ore were various dark silicates, quartz, calcite, pyrrhotite, pentlandite, chalcopyrite, sphalerite, and cementite. The work was conducted to check previous tests and determined a suitable flotation re-agent balance for the treatment of these ores in the new Falconbridge concentrator. These tests are described in detail in report 736 issued by the Mines Branch, Department of Mines, Ottawa.

The Chemical Trade Journal and Chemical Engineer, London, reports a new type of catalyst, for the hydrogenation of oils, is formed of a nickel-aluminium alloy. The nickel content is preferably 7-8 per cent as this insures the most favourable mechanical properties in the product but the best composition for the actual catalytic efficiency is 27-28 per cent of nickel. It is very active and practically insensitive to the actions of poisons such as hydrogen sulphide. By the use of this catalyst, hydrogenation can be effected at ordinary pressures and by means of hydrogen prepared by the iron-steam method.

It is interesting to note that nickel-bearing pyrrhotite deposits were reported in 1933 as having been discovered in Korea. The mineral occurs about eleven miles from the village of Shingukukai or some 35 miles from Gyo-Oku station on the Kankyo Railway. Authoritative information relating to the economic importance of these ores is not available at present.

In 1932 twenty tons of nickel ore were reported as being shipped to Antwerp from the nickel deposits recently discovered at Minas Geraes, Brazil. High-grade material assayed 7 to 8 per cent nickel while the lower grade, of which the greater part of the deposit is composed, contained 2.5 to 3 per cent of the metal.

"Russian Economic Notes" as published by the United States Department of Commerce, Washington, contains the following statement—"The known reserves of nickel, zinc, a number of other non-ferrous metals, and bauxites provide favourable conditions for extensive development, in the Urals, of new branches of non-ferrous metallurgy. The first nickel plant in the Union has been completed at Verkhne-Ugalei".

Table 94.—Principal Statistics of the Complete Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1931-1933

	1931	1932	1933
Number of firms.....	3	3	4
Number of mines.....	6	6	7
Number of smelters.....	3	3	3
Number of refineries.....	1	1	1
Capital employed..... \$	76,702,948	78,188,204	84,836,327
Number of employees—On salary.....	194	188	191
On wages.....	4,106	2,218	3,407
Total.....	4,300	2,406	3,598
Salaries and Wages—Salaries..... \$	716,224	611,496	617,599
Wages..... \$	6,288,179	3,309,099	4,971,011
Total..... \$	7,004,403	3,920,595	5,588,610
Fuel and electricity used..... \$	2,472,510	1,371,985	2,582,216
Estimated value of matte exported and refinery products produced..... \$	27,709,234	14,003,637	31,191,527

Table 95.—Output from Nickel-Copper Mines and Smelters, 1931, 1932 and 1933

	1931	1932	1933
Ore mined..... ton	1,714,075	826,041	1,613,956
Ore shipped..... ton	1,689,874	790,614	1,533,887
Content of ores, etc., shipped—			
Copper..... lb.	123,641,190	92,144,651	125,742,427
Nickel..... lb.	89,424,886	39,001,127	81,078,021
Ores, concentrates treated at smelters..... ton	1,884,959	793,552	1,523,814
Matte produced..... ton	100,273	41,660	82,128
Content of matte—			
Copper..... lb.	77,621,143	32,353,240	51,863,731
Nickel..... lb.	81,285,931	33,871,440	73,420,514
Matte shipped to Canadian refineries..... ton	63,076	6,651	42,209
Matte shipped to foreign smelters..... ton	30,294	21,778	43,315
Converter copper produced..... ton	22,013	30,020	61,385

Table 96.—Proportion of Nickel and Copper in Sudbury Matte, 1924-1933

Year	Percentage			Year	Percentage		
	Nickel	Copper	Total		Nickel	Copper	Total
1924.....	52.6	27.9	80.5	1929.....	44.0	35.1	79.1
1925.....	52.1	27.9	80.0	1930.....	36.6	42.5	79.1
1926.....	49.6	30.6	80.2	1931.....	40.5	38.7	79.2
1927.....	48.4	31.7	80.1	1932.....	40.7	38.4	79.1
1928.....	47.6	32.6	80.2	1933.....	44.7	31.6	76.3

NOTE.—For years 1912 to 1923 see previous reports.

Table 97.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1932 and 1933

	1932				1933			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
Salaried employees—				\$				\$
Mine and mill.....	43		43	153,109	56	3	59	166,531
Smelters and refinery.....	132	13	145	458,387	119	13	132	451,068
Total.....	175	13	188	611,496	175	16	191	617,599
Wage-earners—								
Mine and mill.....	1,167		1,167	1,623,081	1,540		1,540	2,351,650
Smelters and refinery.....	1,051		1,051	1,686,018	1,867		1,867	2,619,361
Total.....	2,218		2,218	3,309,099	3,407		3,407	4,971,011
Grand total.....	2,393	13	2,406	3,920,595	3,582	16	3,598	5,588,610

Table 98.—Wage-Earners Employed by Months, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1931, 1932 and 1933

	1931	1932	1933
January.....	4,726	3,014	1,822
February.....	4,656	3,019	1,957
March.....	4,641	3,039	2,036
April.....	4,620	2,577	1,976
May.....	4,597	2,379	2,034
June.....	4,422	2,434	3,001
July.....	4,324	2,235	3,957
August.....	4,262	1,672	4,523
September.....	3,657	1,628	4,775
October.....	3,068	1,580	5,050
November.....	3,195	1,490	4,968
December.....	3,094	1,551	4,762

NICKEL

Production figures include nickel in matte or speiss exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts sold, valued in the aggregate at the sum obtained from the sales of oxides or salts.

Table 99.—Production of Nickel from Canadian Ores, 1923-1933

(For years 1889 to 1922 see report on the Mineral Production of Canada, 1928)

Year	Pounds of nickel	Value	Year	Pounds of nickel	Value
1923.....	62,453,843	\$ 18,332,077	1929.....	110,275,912	\$ 27,115,461
1924.....	69,536,350	19,470,178	1930.....	103,768,857	24,455,133
1925.....	73,857,114	15,946,672	1931.....	65,666,320	15,267,453
1926.....	65,714,294	14,374,163	1932.....	30,327,968	7,179,862
1927.....	66,798,717	15,262,171	1933.....	83,264,658	20,130,480
1928.....	96,755,578	22,318,907			

Table 100.—Production in Canada, Imports and Exports of Nickel, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$	Pounds	\$
PRODUCTION—						
Nickel in matte and speiss exported, refined and electrolytic nickel produced, and nickel in oxides and salts sold.....	65,666,320	15,267,453	30,327,968	7,179,862	83,264,658	20,130,480
IMPORTS—						
Nickel, nickel silver and German silver, in ingots or blocks, n.o.p.....	36,001	5,318	7,364	2,179	686,777	193,229
Nickel in bars and rods, strips, sheets and plates.....	616,027	228,435	452,781	172,446	203,217	95,189
Nickel silver and German silver, in bars, rods, strips, sheets, plates or anodes.....	85,708	26,558	37,218	12,585	51,742	17,012
Nickel chromium, in bars and rods.....	44,111	45,033	41,434	46,443	50,841	46,210
German, Nevada and nickel silver, manufactures of, not plated.....		229,412		160,798		127,076
Nickel-plated household hollow-ware.....		13,213		12,915		1,900
Nickel kitchenware.....		2,597		825		1,365
Nickel-plated ware, n.o.p.....		1,185,115		845,734		569,862
Total nickel and its products.....		1,735,681		1,253,925		1,051,843
EXPORTS—						
Nickel, fine.....	27,132,700	7,140,520	15,165,500	4,022,748	42,062,200	13,173,273
Nickel contained in matte.....	33,287,600	6,048,508	15,169,200	2,757,713	38,325,300	6,862,502
Nickel in oxide.....	3,108,300	692,637	1,737,200	503,503	7,664,600	2,760,193
Total.....	63,528,600	14,181,565	32,071,900	7,283,964	88,052,100	22,795,968

Table 101.—World Production of Nickel Ore, 1931-1933

(In terms of metal)

(Supplied by the Imperial Institute)

(Long tons)

Country	1931	1932	1933
British Empire—			
Canada.....	29,315	13,539	37,172
India (b).....	804	930	870
Australia.....	(1 cwt.)	(11 cwt.)	9
Total.....	30,100	14,500	38,100
Foreign Countries—			
Greece.....	638	940	1,200
Norway.....	523	930	979
United States (d).....	333	174	113
New Caledonia (c).....	7,318	4,958	4,860
Total.....	8,800	7,000	7,200
World's Total.....	38,900	21,500	45,300

(b) Nickel content of speiss obtained as a by-product in smelting operations.

(c) Estimated content of matte and ferro-nickel obtained at smelters as follows:—

1931.....	3,800 long tons
1932.....	2,200 “
1933.....	4,000 “

(d) Nickel content of salts and nickel produced as a by-product in the electrolytic refining of copper (partly from imported blister copper).

INDUSTRIAL USES OF NICKEL ALLOYS

(Supplied by *International Nickel Co. of Canada, Ltd.*)

Nickel is extensively used, in combination with other metals, in steels, irons and a large number of non-ferrous alloys, many of which are "key" materials of industry.

- Nickel steels ($\frac{1}{2}\%$ to 7% nickel)
- Nickel steel castings (1% to 4% nickel)
- Corrosion resistant steels (7% to 35% nickel)
- Heat resistant steels (7% to 35% nickel)
- Heat resistant alloys (35% to 85% nickel)
- Electrical resistance alloys (up to 85% nickel)
- Iron nickel alloys—
 - Non-magnetic (10% to 25% nickel)
 - Low expansion (35% to 45% nickel)
 - Highly magnetic (45% to 80% nickel)
- Nickel cast irons—
 - High quality cast iron ($\frac{1}{2}\%$ to 5% nickel)
 - High strength cast iron (1% to 2½% nickel)
 - Chilled cast iron (4% to 5% nickel)
 - Corrosion resistant cast iron (12% to 30% nickel)
 - Nickel wrought iron ($\frac{1}{2}\%$ to 5% nickel)
 - Nickel-silver (5% to 30% nickel, plus copper and zinc)
 - Nickel bronzes ($\frac{1}{2}\%$ to 5% nickel)
 - Copper-nickel alloys (15% to 50% nickel)

COPPER

CANADA

Copper production includes copper contained in ores and concentrates exported, copper in blister copper made, in matte exported and in any primary copper sulphate shipped.

Production of new copper in Canada during 1933 totalled 299,982,448 pounds valued at \$21,634,853 as compared with 247,679,070 pounds at \$15,294,058 in 1932. The 1933 output of copper represents an increase of 21.1 per cent over the preceding year and is the largest copper production recorded since the high record quantity in 1930. The average price for the year, based on the London market and transposed into Canadian funds, was 7.4548 cents per pound, an increase of 1.0746 cents per pound over the corresponding price in 1932. It is encouraging to note that the high quality of Canadian electrolytic copper is finding ever growing recognition in world markets, a fact that is reflected in the important exports of this commodity since the commencement of electrolytic copper refining in Canada during 1930 and 1931.

Primary copper production in Quebec in 1933 comprised the metal contained in concentrates exported from Eustis by the Consolidated Copper and Sulphur Company, Ltd., and that contained in anodes produced at the Noranda smelter by Noranda Mines Ltd. During 1933 the Noranda smelter treated 1,010,629 tons of ore, concentrate and refinery slag and produced 65,337,559 pounds of anodes, the average analysis of which was 99.36% copper, 8.70 ounces gold per ton and 15.61 ounces silver per ton; 65,008,731 pounds of fine copper were produced in 1933 as against 63,013,485 pounds in 1932; gold production totalled 284,675 ounces as compared with 341,350 ounces during 1932; the output of silver in 1933 amounted to 510,739 ounces as compared with 619,597 ounces in 1932. Ore shipments from the Horne mine to smelter were 26.5 per cent in excess of 1932 and the tonnage of ore reserves realized a very material increase over the preceding year. Noranda's subsidiary, Canadian Copper Refiners Ltd., operated its electrolytic copper refinery at Montreal East continuously throughout 1933 and an addition was being made for the purpose of producing selenium and tellurium. The refinery treated blister copper made at Flin Flon, Manitoba, by the Hudson Bay Mining and Smelting Co. Ltd., and anode copper received from Noranda; scrap copper was also refined at this plant. Copper products included wire bars, ingot bars, small ingots and cathodes. Gold, silver and selenium were also recovered in the refining operations.

Production of new copper in Ontario in 1933 came almost entirely from the nickel-copper ores mined in the Sudbury area. The International Nickel Company of Canada, Ltd., reports that copper sales, inclusive of copper in sulphate produced in Wales, increased from 57,662,789 pounds to 113,682,312 pounds or 97 per cent. The Copper Cliff smelter produced 53,186 tons of bessemer matte and 61,385 tons of blister copper. Operations at the Copper Cliff plant of the company's subsidiary, Ontario Refining Company, Ltd., were governed entirely by the tonnage of blister copper received from the Copper Cliff smelter as no outside copper was refined. The operations were increased from 4,000 tons of blister copper per month at the beginning of the year to 6,500 tons per month during the last quarter. The total output for 1933 was 58,098 tons of refined copper and the substantial increase in production resulted in lower refining costs. The refinery was in continuous operation during 1933 and production included wire bars, ingot bars, cathodes, phosphorized copper, and gold, silver and selenium. The entire reduction plant of Falconbridge Nickel Mines Limited was in operation at Falconbridge, Ontario, a total of 324 days during 1933; 232,661 short tons of ore were treated and 8,297 short tons of matte produced, the copper content of matte totalled 2,103.5 short tons. The grade of ore treated in 1933 contained .986 per cent copper as compared with 1.045 per cent in 1932. Falconbridge matte is treated in the company's refinery located in Norway. During the year shipments to consumers totalled 3,405,980 pounds of copper for Falconbridge account and the company reports that at one stage sales were actually lost from lack of stock to fill them and production efforts were then consistently directed towards building up refined inventory so that customers' demands could be met. Precious metal sales took care of the whole of their production.

Production of new copper from ores mined during 1933 in Manitoba and Saskatchewan consisted of the metal contained in blister made at Flin Flon by the Hudson Bay Mining and Smelting Company Ltd. The copper smelter of this company was operated continuously during the year. From the Flin Flon concentrates and other products, there was produced and shipped, blister copper containing 41,148,717 pounds of copper, 1,222,895 ounces of silver and 94,745 ounces of gold. Sales during 1933, as reported by the company, comprised 94,745 ounces of gold, 1,210,666 ounces of silver, 40,941,102 pounds of copper and 46,305,736 pounds of zinc.

The copper output in British Columbia in 1933 came chiefly from the ores mined by the Britannia Mining and Smelting Co. Ltd., Britannia Beach, and the Granby Consolidated Mining, Smelting and Power Co. Ltd., Anyox. The Department of Mines of British Columbia reports that in 1933 the former company operated on a curtailed basis with the object of giving employees sufficient work to support them and keep the organization intact as far as possible. There were 622,718 tons of ore milled (compared with a tonnage of 1,920,339 in 1929) from which about 8,000,000 pounds of copper (including precipitates), 12,819 ounces of gold and 42,799 ounces of silver were recovered. The pyrite-concentrate production of the company amounted to 16,629 short tons; copper concentrates of this company are exported to foreign smelters.

Ore milled during 1933 by the Granby Consolidated Mining, Smelting and Power Co. Ltd. totalled 1,534,200 tons having an average copper content of 1.31 per cent as compared with 1,740,300 tons with a copper content of 1.27 per cent in 1932. The net cost per pound of refined copper produced, after allowing credits for gold and silver values and miscellaneous income, but exclusive of depreciation and depletion, was 6.74 cents. As forecast in last year's report of the company, at the present rate of extraction and unless new ore is found, the recoverable ore reserves of the Anyox mines will be exhausted in about two years.

The Consolidated Mining and Smelting Co. of Canada, Ltd., states that the Rossland properties of the company were operated under a system of leasing during 1933, resultant shipments totalled 10,834 tons, which were smelted at Tadanac, one of the lead furnaces being adapted to the purpose, there being insufficient supply to warrant the operation of a copper furnace.

The Mining Journal, London, July 28, 1934, published (in part) under "Whither Copper?": "Copper production has been over-developed in relation, at any rate, to the former price structure. The developments of the last half dozen years have been based on sound economic achievement on the part of new producers, accentuated by the fact that other major producers have their field of operations in countries where exchange is greatly depreciated, or where the copper industry constitutes one of the few major sources of employment and springs of industrial activity. The outstanding feature of the copper position is, without question, the steady increase in production and the prospect of further enlargement."

Put in its most naked form it would seem that we must contemplate the possibility of something like a quarter of a million tons of copper over last year's production coming upon the world's market, which in effect today means London, less any quantity which may be withdrawn owing to the inability of the less economic producers to stand the strain and so be forced into closing down. Of this development, however, there is little sign as yet. If our computations as to enhancement of supply be approximately correct and nothing occurs to interfere with them, we find it difficult to resist the conclusion that the tendency in copper prices must still be downward, though, of course, speculative operations may be expected from time to time, on any favourable developments, to give the market an occasional lift.

Table 102.—Production of Copper from Canadian Ores, 1924-1933

Year	Pounds	Value	Cents per pound	Year	Pounds	Value	Cents per pound
		\$				\$	
1924.....	104,457,447	13,604,538	13-024	1929.....	248,120,760	43,415,251	*
1925.....	111,450,518	15,649,882	14-042	1930.....	303,478,356	37,948,359	*
1926.....	133,094,942	17,490,300	*	1931.....	292,304,390	24,114,065	*
1927.....	140,147,440	17,195,487	*	1932.....	247,679,070	15,294,058	*
1928.....	202,696,046	28,598,249	*	1933.....	299,982,448	21,634,853	*

* Since 1926 the value of Canada's copper production was computed according to the note on page 236.

NOTE.—For years 1886 to 1923 see previous reports.

Table 103.—Production of Primary Copper in Canada, by Provinces and by Sources, 1932 and 1933

	1932		1933	
	Pounds	Value	Pounds	Value
		\$		\$
By PROVINCES—				
Quebec.....	67,336,692	4,296,216	69,943,882	5,214,177
Ontario.....	77,055,413	4,407,928	145,504,720	10,118,847
Manitoba.....	52,706,861	3,362,803	38,163,181	2,844,989
Saskatchewan.....			3,223,941	240,338
British Columbia.....	50,580,104	3,227,111	43,146,724	3,216,502
Total.....	247,679,070	15,294,058	299,982,448	21,634,853
By SOURCES—				
In blister and anode copper produced.....	211,005,663	13,462,583	260,386,164	19,411,268
In ores, concentrates and copper matte exported.....	19,023,221	1,213,719	14,950,300	1,114,515
In nickel-copper matte exported.....	17,650,186	617,756	24,645,984	1,109,070
Total.....	247,679,070	15,294,058	299,982,448	21,634,853

Table 104.—Production of Refined Copper in Canada, 1924-1933

Year	Tons	Year	Tons
1924.....	1,768	1929.....	3,518
1925.....	170	1930.....	31,377
1926.....	10,581	1931.....	92,183
1927.....	9,191	1932.....	90,077
1928.....	8,806	1933.....	112,245

NOTE.—For years 1916 to 1923 see previous reports.

Table 105.—Production of Copper Sulphate in Canada, 1924-1933

Year	Pounds	Year	Pounds
1924.....	127,301	1929.....	617,430
1925.....	121,746	1930.....	734,300
1926.....	404,862	1931.....	62,140
1927.....	566,825	1932.....	*900,220
1928.....	771,400	1933.....	*629,100

* Used by producer.

Table 106.—Quantity and Value of Copper Produced in Canada, by Provinces, 1924-1933

(For production in previous years see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Manitoba		British Columbia		Yukon	
	lb.	\$	lb.	\$	lb.	\$	lb.	\$	lb.	\$
1924.....	1,893,008	246,546	37,113,193	4,833,622			65,451,246	8,524,370		
1925.....	2,510,141	352,474	39,718,777	5,577,311			69,221,600	9,720,097		
1926.....	2,674,058	368,886	41,312,867	4,828,964			89,108,017	12,292,450		
1927.....	3,119,848	403,084	45,341,295	4,946,533			91,686,297	11,845,870		
1928.....	33,697,949	4,909,791	66,607,510	8,770,149			102,283,210	14,902,664	*107,377	15,645
1929.....	55,337,169	10,019,901	88,879,853	14,622,572			103,903,738	18,772,778		
1930.....	80,310,363	10,425,891	127,718,871	15,187,259	2,087,609	215,018	93,318,885	12,114,657	42,628	5,534
1931.....	68,376,985	5,723,154	112,882,625	9,096,463	45,821,432	3,835,254	65,223,348	5,459,194		
1932.....	67,336,692	4,296,216	77,055,413	4,407,928	52,706,861	3,362,803	50,580,104	3,227,111		
†1933.....	69,943,882	5,214,177	145,504,720	10,118,847	38,163,181	2,844,989	43,146,724	3,216,502		

* Includes small quantities produced in 1925, 1926 and 1927, but not reported until 1928.

† In 1933 Saskatchewan was credited with a production of 3,223,941 pounds of copper valued at \$240,338; the metal was recovered from that part of the Flin Flon mine situated on the Saskatchewan side of the Manitoba-Saskatchewan border.

Table 107.—Available Statistics on the Consumption of Copper in Specified Canadian Manufacturing Industries, 1931-1933

Industries	Items (Used)	1931	1932	1933
		Pounds	Pounds	Pounds
*Brass and Copper Products.....	Copper ingots, billets and slabs.....	28,212,000	13,482,000	52,021,000
Brass and Copper Products.....	Copper plates and sheets....	211,000	339,000	334,000
Brass and Copper Products.....	Pipe and tubing.....	176,000	134,000	51,000
Brass and Copper Products.....	Bars and rods.....	518,000	12,000	12,769,000
Brass and Copper Products.....	Wire.....	309,000	1,065,000	1,072,000
Brass and Copper Products.....	Scrap.....	3,394,000	2,055,000	1,382,000
White Metal Alloys.....	Scrap copper.....	919,000	1,337,000	1,607,000
White Metal Alloys.....	Copper bars, etc.....	48,000	31,000	43,000
Electrical Apparatus.....	Pig and bars.....	438,000	224,000	91,000
Electrical Apparatus.....	Rods.....	32,840,000	45,405,000	14,793,000
Electrical Apparatus.....	Tubes and pipe.....	203,000	282,000	120,000
Electrical Apparatus.....	Sheets and plates.....	310,000	191,000	136,000
Electrical Apparatus.....	Wire.....	7,624,000	4,239,000	3,382,000
Iron and steel.....	Copper.....	3,524,000	3,322,000	4,488,000
Grand Total.....		78,726,000	72,121,000	92,289,000

* A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical wire and cable and duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 108.—Imports into Canada and Exports of Copper, 1931-1933

	1931		1932		1933	
	Pounds	Value	Pounds	Value	Pounds	Value
IMPORTS—		\$		\$		\$
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires, electric wires and electric cables for use only in manufacture of such articles in their own factories.....			14,100	1,484	97,400	12,084
*Copper bars for use in the manufacture of rods to be used exclusively in the manufacture of electrical conductors and copper rods for such electrical conductors not to exceed the area of No. 7-0 gauge conductor.....			32,000	3,683	4,000	300
†Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires, electric wires and electric cables for use only in the manufacture of such articles in their own factories, also copper bars for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors and copper rods for such manufacture, the individual units of such electrical conductors not exceeding the area of No. 7-0 gauge conductor.....	9,339,200	960,190	420,300	45,437		

*From April 1 to December 31, 1932.

†From January 1 to March 31, 1932.

Table 108.—Imports into Canada and Exports of Copper, 1931-1933—Concluded

	1931		1932		1933	
	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
IMPORTS—Concluded						
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured.....	348,200	52,552	169,200	26,471	305,900	38,736
Copper in blocks, pigs or ingots.....	965,500	97,526	264,000	18,366	17,200	1,603
Copper, scrap; cathode plates for melting.	753,400	73,289	9,500	627	4,000	247
Copper, in strips, sheets or plates, not polished or coated.....	1,074,600	181,782	286,500	49,578	144,100	25,142
Copper tubing in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured.....	1,874,087	353,685	1,135,966	209,165	256,491	53,464
Copper wire, n.o.p.....	144,125	30,961	44,526	7,804	22,355	3,997
Copper wire cloth, or woven wire of copper.....		7,947		3,416		4,304
Copper wire, single or several, covered with cotton, linen, silk, rubber or other material, including cable so covered.....		85,094				
Copper, all other, manufactures of, n.o.p.....		482,919		350,422		249,680
Copper, precipitate of, crude.....	9,237	1,239	20,303	1,749	20	4
Anodes of nickel, zinc, copper, silver or gold.....		4,877		2,737		2,649
Copper, sub-acetate of, or verdigris, dry.	2,081	586	2,209	318	210	43
Copper, sulphate of, including dehydrated, for agricultural or spraying purposes.....	5,231,723	210,328	5,174,057	164,693	4,585,453	147,335
Copper rollers adopted for use in calico printing.....		87,965		59,066		51,115
Total.....		2,630,440		945,016		590,703
EXPORTS—						
Copper, fine, contained in ore, matte regulus, etc.....	48,761,200	3,891,045	37,964,900	1,915,096	35,436,100	1,723,705
Copper, blister— To United States.....	37,697,700	3,597,146	21,994,500	1,233,060	15,136,000	1,250,750
Total (blister).....	37,697,700	3,597,146	21,994,500	1,233,090	15,136,000	1,250,750
Copper, old and scrap.....	5,127,000	298,228	5,887,600	269,118	4,866,800	264,882
Copper in bars, rods, strips, sheets, plates and tubing†.....	105,203,200	9,278,441	62,346,700	4,673,447		
Copper in ingots, bars, cakes, slabs and billets* (a)— To United Kingdom.....			59,395,500	3,228,814	89,844,400	6,039,394
United States.....			36,425,500	2,231,263		
British India.....					677,900	33,902
Denmark.....			190,700	10,301	1,606,700	115,532
France.....			9,074,000	536,178	16,349,800	1,038,237
Germany.....			3,545,100	191,840	15,182,000	1,098,594
Italy.....			3,174,800	186,194	1,076,500	73,989
Japan.....					2,130,700	154,581
Netherlands.....			2,085,200	115,033	12,532,100	908,359
Poland and Danzig.....					235,400	18,570
Sweden.....			1,960,100	112,419	1,704,100	114,921
Belgium.....			3,208,900	183,532	11,997,300	749,805
Other countries.....			200	17	11,400	706
Total (ingots, etc.).....			119,060,000	6,795,591	153,348,300	10,346,590
Copper in rods, strips, sheets, plates and tubing* (b).....			19,516,900	1,185,102	38,700,600	3,061,014
Copper wire and cable, insulated.....		52,468		134,932		122,260
Copper manufactures, n.o.p.....		38,590		25,252		148,745
TOTAL COPPER AND ITS PRODUCTS—						
To—United States.....		13,652,932		7,953,261		2,158,259
United Kingdom.....		1,961,794		5,728,534		9,569,811
Other countries.....		1,540,987		2,549,803		5,189,876
Grand Total.....		17,155,713		16,231,628		16,917,946
Copper coin—Foreign.....		22,866		66,231		22,866
Copper coin—Canadian.....		340		537		340

(a) This item not specified in 1931.

(b) Figures for 1931 shown above.

*To Oct. 12, 1932.

†From Oct. 12, 1932.

Table 109.—Montnly Average Prices of Copper (Electrolytic), New York and London, 1931-1933

(From the *Engineering and Mining Journal*)

	New York (In cents per pound)			London (£ Sterling per long ton)		
	1931	1932	1933	1931	1932	1933
January.....	9.938	7.060	4.775	47.524	46.200	33.244
February.....	9.724	5.965	4.775	47.950	41.381	32.556
March.....	9.854	5.763	5.011	47.699	36.786	32.370
April.....	9.392	5.565	5.395	45.375	34.190	33.681
May.....	8.665	5.237	6.698	42.175	32.833	38.163
June.....	8.025	5.145	7.773	38.966	30.841	41.000
July.....	7.698	5.053	8.635	37.293	29.107	41.524
August.....	7.292	5.219	8.768	35.388	34.784	40.227
September.....	6.988	5.978	8.753	36.148	38.318	38.339
October.....	6.775	5.733	7.950	41.000	36.190	36.977
November.....	6.558	5.131	7.881	41.190	36.568	33.898
December.....	6.580	4.813	7.885	44.409	34.344	34.329
Average.....	8.116	5.555	7.025	42.093	35.962	36.359

Using the par of exchange in New York for the first 9 months of 1931 and the average monthly rate of exchange for each of the last three months the average value of copper in Canadian funds for the year was 8.370 cents per pound. The average price of copper in London for 1932, transposed to Canadian funds, was 6.3802 cents per pound, the corresponding Canadian price in 1933 was 7.4548 cents.

Table 110.—World Production of Copper Ore, 1931-1933

(In terms of metal)

(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	66	61	40	—concluded			
N. Rhodesia.....	32,403	87,239	129,423	Portugal (estimated)	3,000	2,000	2,000
S. Rhodesia (smelter)	530	6		Roumania.....	21	12	23
South West Africa (c)	8,300	2,400		Russia (estimated)...	30,600	31,500	31,000
Union of South Africa	10,045	9,254	8,250	Spain.....	53,000	32,000	29,000
Canada.....	130,493	110,571	133,921	Sweden.....	1,608	4,241	6,762
Cyprus.....	3,800	3,200	4,230	Algeria.....		34	24
India (estimated).....	11,500	11,200	10,700	Belgian Congo			
Australia.....	13,532	14,658	14,413	(smelter).....	118,000	53,000	65,544
Newfoundland.....	1,423	2,091	3,167	French Equatorial			
Total.....	212,000	241,000	304,000	Africa.....	80	445	1,800
FOREIGN COUNTRIES				French West Africa..	200		
Austria.....	1,292	168	131	Cuba.....	13,293	5,833	7,300
Bulgaria (ore).....	900	40		Mexico (b).....	53,355	34,698	39,196
Czechoslovakia.....	1,661	66		United States (b)....	472,210	212,599	175,170
Finland.....	6,100	6,300	5,300	Bolivia (exports)....	2,016	1,958	1,819
France.....	332	428	(a)	Chile.....	212,308	101,600	160,000
Germany.....	29,356	30,255	30,988	Peru.....	43,623	22,369	25,000
Hungary.....	164	274	(a)	Formosa.....	4,000	3,400	3,900
Italy.....	431	375	16	China (smelter).....	291	433	497
Yugoslavia.....	27,000	17,900	33,500	Japan (smelter).....	74,650	70,741	67,374
Norway.....	8,565	16,501	19,500	Korea.....	800	800	900
				Turkey.....	61		
				Total.....	1,160,000	650,000	700,000
				World's Total...	1,370,000	890,000	1,000,000

(a) Information not available.

(b) Amount estimated as recoverable.

(c) Years ended March 31 of the year following that stated.

Table 111.—World Metal Production of Copper, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—concluded			
United Kingdom.....	16,000	13,100	11,100	Yugoslavia.....	23,967	29,683	39,721
Northern Rhodesia...	8,927	67,887	104,205	Norway.....	4,233	5,330	6,588
Southern Rhodesia...	530	6	.....	Roumania.....	.....	108	446
Union of South Africa	10,063	9,239	8,236	Russia.....	40,000	45,900	44,600
Canada (d).....	108,842	94,199	116,228	Spain.....	25,327	15,310	16,995
India.....	4,069	4,443	4,800	Sweden.....	2,958	3,237	6,660
Australia.....	12,936	13,307	11,238	Belgian Congo.....	118,000	53,000	65,544
Total.....	161,000	202,000	256,000	Mexico.....	42,243	43,047	39,300
FOREIGN COUNTRIES				United States.....	528,691	274,591	223,634
Austria.....	3,184	1,956	995	Chile.....	219,983	95,976	154,021
Belgium.....	30,904	26,524	30,000	Peru.....	45,366	21,175	24,460
Czechoslovakia.....	1,196	921	767	China.....	291	433	497
France (c).....	1,056	1,000	1,000	Hungary.....	.....	274	310
Germany (b).....	54,600	50,100	49,000	Japan.....	74,650	70,741	67,942
Italy.....	710	420	118	Korea.....	674	683	772
				Total.....	1,220,000	740,000	700,000
				World's Total....	1,330,000	940,000	1,030,000

(a) Information not available.

(b) Metallgesellschaft figures.

(c) Includes some matte.

(d) Copper content of blister copper.

METALS OF THE PLATINUM GROUP

The output of the platinum metals in Canada comes almost entirely from the copper-nickel ores of the Sudbury district in Ontario. The recovery and refining of these metals are accomplished in European metallurgical plants. Relatively small amounts of platinum are recovered annually from stream gravels in British Columbia. 55,795 fine ounces of new platinum, palladium and other platinum group metals valued at \$1,502,633 were recovered from Canadian ores in 1933 as compared with a corresponding output of 64,956 fine ounces at \$2,001,283 in 1932.

The British Columbia Department of Mines in its 1933 annual report states that "according to reliable reports and due to the increased value of gold, further testing of the Tulameen and Similkameen gravels will be done during 1934 . . several small groups and individuals made a living on Granite Creek, the Tulameen and Similkameen rivers, where the percentage of iridium in the platinum found assisted considerably. A total of about 232 ounces of gold and 40 ounces of platinum was reported to have been received by the banks and local stores. Undoubtedly much more was sold elsewhere."

The 1933 annual report of the International Nickel Company of Canada, Ltd. contains the following information relating to the platinum metals: "The world consumption of new platinum during 1933 is estimated to have been about 175,000 ounces, as compared with an estimated consumption of 75,000 ounces in 1932 and a normal consumption of perhaps 200,000 to 225,000 ounces. The New York price of platinum rose from \$24 per ounce early in 1933 to about \$38 per ounce at the close of the year. Increased activity in the platinum market has followed the substitution of platinum for white and colored golds in the jewellery field, due partly to the restrictions which have in some countries attended the industrial use of gold. The greater demand for platinum in certain industrial and chemical fields was due primarily to the more favourable competitive price position of platinum as compared with gold and other metals. Probably for the first time the amount of platinum used in the industrial arts substantially exceeded that used for jewellery. Important in this respect has been the well maintained demand for platinum and platinum alloys for spinnerets in the rayon industry and for gauze catalysts in the ammonium-oxidation synthesis of artificial nitrates. Palladium has likewise fared well during the year, its price rising from about \$17 per ounce in New York at the outset of the year, to about \$23 toward the close. The consumption of palladium, as well as platinum for dental golds and white dental alloys, has continued to increase and both metals have secured a fairly broad and stable market in this field. Of interest has been the introduction and use of palladium

leaf or foil for certain style features and decorative effects in connection with ladies' shoes, hats and gloves, as well as on picture framing and outdoor signs and decorations, where gold was formerly employed. Possessing, for electrical purposes, qualities similar to those of platinum, this metal is also finding extensive use for contact points in communication equipment, where reliability in performance is essential. The newer outlets for the platinum metals are thus gaining in importance and contributing to the maintenance of a stable and diversified market for these metals."

Falconbridge Nickel Mines, Ltd. reported that at the end of the year construction work was going on at its Norwegian refinery in preparation for separating the precious metals.

Regarding Russian platinum production "The Mining Journal", London, in its annual review of platinum and the associated metals, says: "Conventionally Russia is credited with an output of a round figure of 100,000 ounces. Whether this was reached or exceeded in 1933 there is no means of knowing nor is the outside world interested so much in production as in sales, which are centralized in its Berlin office, the Edelmetallevertriebs. There have been occasional reports of stocks being tied up as collateral for loans made by German banks and it is just possible that the actual supplies free for disposal have been curtailed. In more normal times Russian sales seem to have run about 70,000 ounces."

The Department of Mines of the Union of South Africa in its 1933 annual report states that the Rustenburg Platinum Mines Ltd. restarted mining operations during 1933 and a double shift was being worked, a new reduction plant is in course of erection for the purpose of treating the sulphide ores.

Sales of platinum metals in the Union of South Africa totalled 27,758.5 ounces valued at £168,105 in 1933 as compared with 7,086.2 ounces at £43,352 in 1932.

Platinum consumed in the Canadian jewellery and silverware industry amounted in value to \$32,140 in 1931, \$26,928 in 1932 and \$32,183 in 1933.

Table 112.—Production of Platinum Group Metals in Canada, 1932 and 1933

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	Value	Fine ounces	Value
1932				
Ontario.....	27,284	1,097,021	37,613	901,890
British Columbia.....	59	2,372	.....	.....
Total.....	27,343	1,099,393	37,613	901,890
1933				
Ontario.....	24,746	856,190	31,009	645,043
British Columbia.....	40	1,400	.....	.....
Total.....	24,786	857,590	31,009	645,043

Table 113.—Production of Metals of the Platinum Group, 1924-1933

(From 1887 to 1923 see Mineral Production of Canada, 1928)

Year	Platinum				Palladium	
	Lode		Placer		Fine oz.	\$
	Fine oz.	\$	Fine oz.	\$		
1924.....	9,181	1,090,858	5	569	8,923	811,993
1925.....	8,692	1,027,477	6	715	7,856	608,727
1926.....	9,471	919,349	50	4,258	9,790	626,166
1927.....	11,217	716,653	11	960	11,247	541,319
1928.....	10,483	706,090	49	2,819	11,909	511,998
1929.....	12,491	845,057	28	1,699	12,408	471,614
1930.....	34,007	1,542,490	17	771	29,959	689,217
1931.....	44,725	1,595,117	50	1,783	39,313	786,260
1932.....	27,284	1,097,021	59	2,372	29,727	548,582
1933.....	24,746	856,190	40	1,400	*31,009	645,043

*Includes other platinum metals except platinum.

Table 113.—Production of Metals of the Platinum Group, 1924-1933—Concluded

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1924.....	367	27,500	78	2,106	69	4,924	79	16,590
1925.....					432	40,242		
1926.....	204	9,969	16	791			14	3,252
1927.....	222	6,853	31	1,073			45	4,945
1928.....	895	20,951	561	16,331			242	78,553
1929.....	3,037	151,850	1,376	66,048			497	119,777
1930.....	(a) 4,133	206,650						
1931.....	(a) 7,605	431,457						
1932.....	(a) 7,886	353,308						
1933 (b).....								

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

(b) Included with palladium.

Table 114.—Imports into Canada and Exports of Platinum, 1931-1933

	1931		1932		1933	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
IMPORTS—		\$		\$		\$
Crucibles.....		7,106		8,638		13,029
Wire and bars, strips, sheets or plates, platinum, palladium, iridium, osmium, ruthenium and rhodium in lumps, ingots, powder, sponge or scrap.....		45,802		29,740		49,136
Retorts, pans, condensers, tubing and pipe, when imported by manufacturers of sulphuric acid for use exclusively in the manufacture or concentration of sulphuric acid in their own factories.....		1,520		30		11,809
Total.....		54,428		38,408		73,974
EXPORTS—						
Platinum contained in ores and concentrates.....	14,202	1,135,388	14,570	1,155,705	29,228	1,168,565
Old and scrap.....	81	2,070	50	2,374	189	5,439
Total.....	14,283	1,137,458	14,620	1,158,079	29,417	1,174,004

Table 115.—Platinum Metals Consumed in the United States, as Reported by Refiners and by Industries, 1932 and 1933

(From *Mineral Industry, 1932*)

(In Troy ounces)

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1932						
Chemical.....	5,157	495	52	218	5,922	7
Electrical.....	3,456	6,309	431	23	10,219	12
Dental.....	8,683	12,900	73	9	21,665	26
Jewellery.....	33,376	5,817	1,719	314	41,226	50
Miscellaneous.....	3,896	204	274	27	4,401	5
Total.....	54,568	25,725	2,549	591	83,433	100
1933						
Chemical.....	14,085	338	82	173	14,678	14
Electrical.....	3,422	5,367	526	30	9,345	9
Dental.....	11,149	15,946	116	19	27,230	25
Jewellery.....	41,263	4,413	3,608	508	49,792	46
Miscellaneous.....	6,274	100	144	258	6,776	6
Total.....	76,193	26,164	4,476	988	107,821	100

Table 116.—World Production of Platinum Metals, 1931-1933

(Supplied by Imperial Institute)

(Fine ounces)

Country and product	1931	1932	1933	Country and product	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES			
<i>Sierra Leone</i> —				<i>Papua</i> (years ended June 30)			
Crude.....	594	531	423	Osmiridium (crude).....	20	1	29
				Platinum (crude).....		2	
<i>Union of South Africa</i> —				<i>Russia</i> —			
Crude (content).....	41,220	7,766		Crude platinum (estimated).....	100,000	100,000	100,000
Concentrates (content)....	5,943	1,480	2,386				
Osmiridium (crude) (b)...	6,306	6,523	6,712	<i>Abyssinia</i> —			
				Platinum (crude).....	(b) 6,232	8,217	6,650
<i>Canada</i> —				<i>United States</i> —			
Platinum from placers....	50	59	40	Platinum (crude).....	885	1,074	1,266
Recovered from Ontario				New platinum metals recovered by refineries			
nickel-copper matte—				from domestic gold and			
Platinum.....	44,725	27,284	24,746	copper ores—			
Palladium.....	39,313	29,727		Platinum.....	5,397	1,694	1,050
Other metals.....	7,605	7,886	31,009	Palladium.....	2,595	1,147	698
				Iridium.....	49	2	8
<i>New South Wales</i> —				Osmiridium.....		1	
Crude platinum.....	283	336	113	Others.....	85		1
				<i>Colombia</i> —			
<i>Tasmania</i> —				Platinum (crude).....	35,793	40,478	45,971
Osmiridium (crude).....	1,280	785	548				
				<i>Japan</i> —			
<i>New Zealand</i> —				Platinum (crude).....	275	266	206
Crude platinum.....	1		4	<i>Belgian Congo</i> —			
				Palladium.....		2,025	559

(a) Information not available.

(b) Amount registered, which is probably not total production.

(c) Secondary metals were recovered as follows (Troy ounces):—

	1931	1932	1933
Platinum.....	33,837	21,635	35,073
Palladium.....	6,331	5,783	4,814
Iridium.....	1,823	3,726	692
Others.....	1,743	1,444	783

NOTE.—It is estimated by the Department of Mines, Union of South Africa, that the osmiridium produced in these years contained the amounts of the metals mentioned below (fine ounces):—

	1931	1932	1933
Osmium.....	1,989	1,603	2,602
Iridium.....	1,680	1,365	2,082
Ruthenium.....	813	655	1,071
Platinum.....	737	616	876
Rhodium.....	30	25	30

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics, Showing Production by Provinces, Imports, Exports, Prices and World Output Tables on Aluminium, Antimony, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tin, Titanium, Tungsten and Vanadium

1. General Review

Metal-bearing minerals, mined or treated usually by a very few operators, have been grouped in this chapter for consideration as a single industry. The iron and steel industry is one of the larger and better organized in Canada; ores utilized in Canadian iron furnaces are imported either from the Mesabi range in Minnesota, U.S.A., or from the Wabana deposits on Bell Island, Newfoundland. Iron ores consisting of hematite, siderite and magnetite occur in rather extensive deposits in Canada. These ores are usually of lower grade than those imported and their utilization in the Canadian steel industry would necessitate the employment of beneficiation methods. The Canadian aluminium industry is also very important; the production of this metal in the Dominion comes entirely from the province of Quebec. Bauxite, the crude aluminium ore employed in the manufacture of Canadian made aluminium, is mined in foreign countries.

This chapter also includes a review of the occurrences of antimony, beryllium, cadmium, chromium, lithium, magnesium, manganese, mercury, molybdenum, radium, selenium, tin, tungsten and vanadium ores in Canada. The mining of these in Canada at the present time is relatively unimportant, and their future economic value will be largely determined by the existing demand and the extent of available supplies from other producing countries.

Some of these smaller industries have, in the past, attained considerable importance and it is probable that future technical research and industrial requirements may once again stimulate expansion in these and other undeveloped mineral fields.

For historical purposes and to provide the interested reader with available data, tables have been prepared for this report that set out the known facts regarding production in these industries.

Mining or metallurgical operations relating to the development or extraction of ores or production of metals that are classified in this chapter as miscellaneous were, with the exception of aluminium, relatively small in 1933 as compared with those of the gold and other major metal mining industries.

Table 117.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1932 and 1933

	1932			1933		
	Number of employees		Salaries and wages	Number of employees		Salaries and wages
	Male	Female	\$	Male	Female	\$
Salaried Employees—						
Total.....	5		8,335	5		3,312
Wage-earners—						
Surface.....	20		26,846	13		10,963
Underground.....	8			6		
Mill.....	1					
Total.....	29		26,846	19		10,963
Grand Total.....	34		35,181	24		14,275

2. Commodity Statistics on Aluminium, Antimony, Beryllium, Bismuth, Cadmium, Calcium, Chromite, Iron Ore, Pig Iron, Ferro-Alloys, Steel and Rolled Products, Manganese, Mercury, Molybdenum, Radium, Selenium, Tin, Titanium and Tungsten

ALUMINIUM

Aluminium is a product of the electric furnace; alumina, which has been recovered by chemical means from bauxite, is dissolved in molten cryolite in the electric furnace; a low voltage current decomposes the oxide into metallic aluminium and oxygen, the metal sinking to the bottom of the crucible. All cryolite ore is obtained from Greenland. Aluminium, in addition to its use in the pure state, is alloyed with other metals including copper, nickel, cobalt, iron, antimony, tin, zinc, beryllium and magnesium. Pure aluminium powder is used in the thermit process to reduce the oxides of certain metals to the metallic state.

Aluminium ores have not been found in commercial quantities in Canada. Metallic aluminium is produced from foreign ores by the Aluminum Company of Canada, Ltd., at Shawinigan Falls and Arvida, P.Q. As there is only one Canadian company producing primary aluminium, statistics regarding the smelting operations have been included with data supplied by the smelters producing non-ferrous metals from Canadian ores. Metallic aluminium was produced during 1933 at Arvida and Shawinigan Falls, Quebec, by the Aluminum Company of Canada, Ltd. The metal was fabricated in the form of ingots from alumina produced from foreign ores. The aluminium fabricating plant at Shawinigan Falls was in continuous operation throughout the year; the Shawinigan reduction plant was, however, closed down from August 31. At Arvida the slag ore plant was idle during 1933 but the reduction works was active during the entire year. An encouraging feature in the industry was the recording of an increase in the value of aluminium exports of 61 per cent over 1932.

An abstract from "Technische Blatter" as reprinted by "Canadian Chemistry and Metallurgy" contains the following interesting information: "Recent German research under Professor P. Rontgen of the Institute F. Metallhüttenwesen V. Elektrometallurgie has achieved results which indicate a solution of the problem of producing aluminium from clay. Numerous investigations have been carried out, the advantages of the sulphide as an intermediary have been studied and verified, and a process has been evolved which promises to be economically sound . . . It remains now to translate the experience gained in these experiments into commercial practice, and to establish more exactly the economy of the new process."

In 1932 a light streamline railcar built almost entirely of strong aluminium alloys was completed in the U.S.A. and work continued on the aluminization of a pullman and a de luxe passenger coach. During the year pressed aluminium alloy frames for trucks and trailers were placed on the market. It is noteworthy that in 1930 approximately 4 per cent of the total consumption of aluminium in the United States was employed in the building industry while in 1932 it had risen to 10 per cent. Aluminium foil has now been adopted for the insulation of some electric refrigerators.

The "Mineral Industry" states that the aluminium industries in 1933 continued to still lower levels, the decline markedly evident in 1931 and 1932. Curtailed production was world wide. Plants shut down in 1931 did not reopen and operate in 1932 or 1933. All producers expended considerable energy in the development of wider markets, new articles, and greater varieties of forms of fabricated shapes. It is interesting to note that Canada during the year became the second largest producer, surpassing France, Germany, Great Britain, Norway and Switzerland.

The average New York open-market quotation since 1931 for virgin aluminium, 98-99%, as reported by "American Metal Market" has been 22.90 cents per pound. These quotations, especially in recent years, are reported in excess of prices actually realized on large scale business.

Table 118.—Imports into Canada and Exports of Aluminium, Alumina, Bauxite and Cryolite, 1931, 1932 and 1933

	1931		1932		1933	
	Cwt.	\$	Cwt.	\$	Cwt.	\$
IMPORTS—						
Alumina.....	20,006	81,966	678	7,356	753	8,461
Bauxite.....	1,896,191	3,045,208	1,032,948	2,037,553	1,050,641	1,750,230
Cryolite.....	47,074	188,414	1,747	14,637	47,327	204,357
Aluminium in pigs, ingots, blocks, notch bars, slabs, billets and blooms.....	3,333	65,568	2,071	32,319	1,091	26,882
Aluminium scrap*.....			490	7,406	1,394	21,794
Aluminium in bars, rods and wire.....	4,046	92,509	806	31,357	452	14,570
Aluminium in plates, sheets and strips, including circles.....	14,415	353,420	12,578	287,827	7,993	239,395
Aluminium pipes and tubes.....	433	22,204	589	30,268	463	21,439
Aluminium leaf or foil, less than .005 inch, plain, etc.....		128,670		113,341		40,579
Aluminium kitchen or household hollow-ware, n.o.p.....		203,962		94,843		61,428
Aluminium, manufactures of, n.o.p.....		1,011,644		745,570		405,103
Others.....				1,512		19,150
Total Aluminium and Its Products.....		5,193,565		3,403,989		2,813,388
EXPORTS—						
Aluminium scrap.....	37,302	393,766	13,116	135,543	14,988	176,269
Aluminium in bars, blocks, etc.—						
To: United Kingdom.....	115,065	1,890,546	78,810	1,175,532	228,607	4,035,786
United States.....	24,402	358,634	19,811	310,806	17,464	284,265
Argentina.....	3,233	66,099	2,905	52,771	3,031	60,251
Brazil.....	2,220	45,124	3,219	57,228	1,562	34,292
China.....	5,563	107,003	4,524	77,368	5,709	103,359
Germany.....	1,222	16,754	569	8,565		
Japan.....	36,271	576,420	47,848	720,275	77,728	1,358,987
Norway.....			5,711	83,457		
Russia.....			2,531	56,279		
Sweden.....	455	9,109	14,019	193,684		
British India.....	9,575	223,743	1,178	22,546	954	22,719
Belgium.....	2,873	63,343	136	2,310	1,222	22,637
Mexico.....	1,201	23,389	567	11,365	987	21,195
Others.....	13,312	213,066	1,302	25,068	1,871	36,397
Total in bars, blocks, etc.....	215,392	3,593,230	183,450	2,797,257	339,135	5,979,988
Aluminium kitchen utensils and hollow-ware.....		5,167		8,691		8,634
Aluminium, manufactures of, n.o.p.....		503,014		961,895		137,083
Total Aluminium and Its Products.....		4,495,177		3,903,386		6,391,974

* From October 12, 1932.

Table 119.—Estimated World Production of Aluminium, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933
BRITISH EMPIRE			
United Kingdom.....	14,000	10,000	10,800
Canada.....	28,000	17,500	15,900
Total.....	42,000	27,500	26,700
FOREIGN COUNTRIES			
Austria.....	3,000	2,000	2,100
France.....	(c) 17,865	14,300	14,300
Germany.....	27,000	18,700	18,650
Italy (c).....	10,931	13,201	11,880
Norway (c).....	21,082	17,506	15,141
Russia.....	(a) 1,134	1,000	3,000
Spain.....	(c) 1,134	(c) 1,136	1,000
Switzerland.....	13,000	8,000	7,400
United States (c) (d).....	79,261	46,824	38,003
Total.....	173,000	123,000	111,000
World's Total.....	215,000	150,500	137,700

(a) Information not available.

(c) Official figures.

(d) Secondary metal was recovered as follows:—

1931.....	27,054 long tons
1932.....	21,400 "
1933.....	29,900 "

Table 120.—World Production of Bauxite, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932 ^{1a}	1933
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
Northern Ireland.....	3,340	1,473	698	Greece.....	1,132	581	(a)
British Guiana (c).....				Hungary.....	88,142	109,796	71,281
60% or over alumina....	124,963	65,107	32,441	Italy.....	66,305	85,186	93,320
50-60% alumina.....			716	Yugoslavia.....	63,818	66,024	85,274
30 to 50% alumina (b)...	32,115	18,396	8,173	Roumania.....	375	602	1,138
India.....	4,298	4,467	1,075	Spain.....		1,300	2,500
Australia.....	1,580	1,129	670	U.S.R.R. (Russia).....	(a)	846	4,300
Total.....	166,000	91,000	44,000	United States.....	195,895	96,349	154,176
FOREIGN COUNTRIES—				Dutch Guiana.....	170,419	(a)124,522	(d)104,697
France.....	397,176	387,446	470,243	Total.....	980,000	870,000	990,000
Germany.....		1,612	(a)	World's Total*.....	1,149,000	960,000	1,030,000

(a) Information not available.

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows:—

	1931	1932	1933
Metallic.....	104,788	40,276	10,273
Chemical.....	22,685	22,129	25,095
Refractory.....		102	716

(d) Exports.

Table 121.—Production (Exports) of Cryolite from Greenland, 1929-1933

	Long tons
1929.....	29,310
1930.....	35,671
1931.....	17,427
1932.....	17,592
1933.....	10,187

ANTIMONY

Antimony bearing minerals are known to occur in British Columbia, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, and the Yukon. The greater part of the Canadian output of refined antimony was produced in the years 1907, 1909, 1915 and 1916 by the Consolidated Mining and Smelting Company at Trail, B.C.; the metal was recovered as a by-product in the treatment of silver-lead ores. The remainder of the Canadian antimony production came from deposits mined in Nova Scotia and New Brunswick.

A vein containing auriferous stibnite and native antimony associated with arsenopyrite, pyrite, and galena was mined at West Gore, Hants County, Nova Scotia, during the war period; the ore was milled at the property to yield a 38 to 45 per cent antimony concentrate. There has been no Canadian production of antimony since 1926.

Stibnite, with small quantities of native antimony, was discovered about 1850 in the slates and quartzites at Prince William, York county, New Brunswick. Local attempts to reduce the ore were failures, crude ore was then shipped until the property closed in 1890. During the late war period this ore was smelted and refined near Lake George. During 1931, 25 tons of antimony ore were shipped to Liverpool, England, from the Lake George mines, York county, New Brunswick. This shipment was made for experimental purposes.

Antimony ores are rare in the province of Ontario. Minerals containing this metal have been found in Hastings, Addington and Frontenac counties and in the silver ores of the Cobalt district. Antimony deposits have been partially developed in South Wolfe county, Quebec.

There are several occurrences of antimony in British Columbia. In the Bridge river area, Lillooet mining division, stibnite occurs in quartz; the ore here contains, on the average, 40 to 60 per cent antimony and is free from arsenic, zinc and lead. A few shipments have been made from a deposit on the north fork of Carpenter creek in the Slocan district. Antimony has also been found on Graham Island, at Tatlayoko lake, Nanaimo district, and in the vicinity of Kamloops lake where it is associated with cinnabar.

In the Yukon Territory antimony ores occur in the Carbon and Chieftain hills near the Wheaton river.

No sales of antimony ores were recorded in Canada in 1933. There was, however, a small shipment of high grade antimony ore made to Germany in 1932 from the Lake George mines, York county, New Brunswick; this was for experimental purposes.

Prices for antimony ores were quoted in September, 1934, by "Metal and Mineral Markets" as follows: Per unit, 90 cents to \$1.00, f.o.b. New York. London, per long ton unit, 3s. 9d. to 4s. 3d. for 60 to 65 per cent sulphide ore. Storage batteries and bearing metals normally account for a very great part of antimony consumption.

The Antimony Trade Association, for Hunan, China, which took control of the local industry at the opening of 1933, while apparently not entirely successful in controlling sales and prices, may have influenced production and accomplished some curtailment. The original monopoly scheme having collapsed, the association became a Trading Company only.⁽¹⁾

Table 122.—Production of Antimony in Canada, 1911-1933

Year	Antimony ore		Refined regulus		Antimony in silver-lead-bismuth bullion exported	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1911-1914.....						
1915.....	1,341	81,283	59,440	11,888		
1916.....	885	94,537	107,185	41,823		
1917.....	361	22,000				
1918-1924.....						
1925.....					1,751	206
1926.....					1,596	281
1927-1933.....						

NOTE.—For years 1886 to 1910 see previous reports.

Table 123.—Imports of Antimony into Canada, 1931-1933

	1931		1932		1933	
	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
Antimony, or regulus of.....	919,724	56,458	631,204	37,180	626,854	32,796
Antimony salts, viz.: Tartar emetic, chloride and lactate (antimonine).....	3,178	482	50,466	6,869	28,861	4,371
Antimony salts for dyeing.....	46,017	2,763	678	86	57,138	2,288
Total.....		59,703		44,135		39,455

Table 124.—World Production of Antimony Ore, 1931-1933

(In terms of metal)

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1931	1932	1933	Producing country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Canada (ore).....	22			Algeria.....	100	261	(a) 40
Australia.....	42	60	47	Morocco (Spanish).....	70	100	
FOREIGN COUNTRIES				Mexico.....	5,357	1,317	1,919
United States.....		374	524	Bolivia (exports).....	1,327	1,446	1,866
Czechoslovakia.....	556	588	1,341	Peru.....		31	39
France.....	811	630	(a)	China.....	13,108	12,191	12,600
Greece.....	268	325	(a)	Turkey.....	21		44
Italy.....	331	372	364	Japan (ore).....	28	66	(a)
Yugoslavia.....	358			Korea (ore).....		7	21

(a) Information not available.

¹ The Mineral Industry.

BERYLLIUM

Shipments of beryl crystals were made to Germany in 1927 from a deposit in Lyndoch township, Renfrew county, Ontario. Beryl occurrences in the pegmatites of eastern Manitoba have been investigated during recent years. Beryllium is a steel-grey metal, it tarnishes easily in air and shows a complete lack of ductility at ordinary temperatures. The density is 1.84 or less than that of aluminium. A remarkable property of beryllium, and one which has already been put to extensive practical use, is the fact that it is remarkably transparent to X-rays.

Considerable research work has been conducted as to the commercial utilization of the metal beryllium, especially in alloys. The principal ore of beryllium consists of the mineral beryl ($\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$). There are several known occurrences of this mineral in Canada and shipments of beryllium ores have been made for experimental purposes from deposits in Renfrew county, Ontario, and from the Oiseau river area in Manitoba. No commercial shipments were recorded either in 1931, 1932 or 1933.

The following information relating to beryl and beryllium is from the "Engineering and Mining Journal," New York: "Inasmuch as beryl shoots in the Black Hills, S.D. pegmatites rarely contain more than 1 to 2 per cent of beryl, it is usually necessary to mine 50 tons or more of dike material to get one ton of beryl. The highest price obtained for beryl in recent years was \$55 and the present price, f.o.b. Keystone, is \$35; so only in exceptional cases can the pegmatite be worked at a profit for beryl alone. . . . Beryl is used in the manufacture of porcelain, and in Germany there is one firm which devotes its efforts to the production of beryllia for ceramic use. In the United States, beryllia has recently found commercial application as an electrical refractory, and the beryllium chemical industry, as distinguished from the metal industry, is undergoing rapid development. Another important use of beryl is as a precious stone. Emeralds, aquamarines and gem beryls are transparent varieties of beryl. Both scientific and practical uses of beryllium have recently attracted attention. Scientists have used the metal to study atomic structure and due mainly to the efforts of the Beryllium Corporation in the United States and of Siemens & Halske in Germany, methods of manufacture have been improved and prices reduced, with the result that a copper-beryllium alloy is now available for engineering use, and alloys of beryllium with iron, with aluminium, and with nickel may soon find their way into the market."

It was reported late in 1933 by "Chemische Industrie" that plans were mooted for manufacturing metallic beryllium in Europe on a large scale on the island of Cseped, to the south of Budapest.

Beryllium ore prices were quoted by "Metal and Mineral Markets" in September, 1934, as follows: per ton, carload lots, minimum 10 per cent BeO , \$30; minimum 12 per cent, \$35, f.o.b. mines. Beryllium copper—per pound, containing 12.5 per cent of Be, \$6.25 for 1 to 10 pounds; \$4.25 for 11 to 50 pounds; \$3.81 for 51 to 200 pounds. Beryllium-iron per pound, containing about ten per cent Be, \$3.07 for 51 to 200 pounds. Beryllium nickel, per pound, containing about 10 per cent Be, \$3.07 for 51 to 200 pounds.

BISMUTH

Bismuth occurs in small quantities with ores of the Cobalt district in Ontario and in ores treated at the Trail smelter in British Columbia.

Production of new bismuth in Canada during 1933 totalled 78,303 pounds valued at \$81,526 as compared with an output of 16,855 pounds worth \$7,340 in 1932. The production in both 1932 and 1933 consisted of the metal contained in silver-lead-bismuth bullion exported by the Deloro Smelting and Refining Company, Ltd., Deloro, Ontario, and metallic bismuth produced in British Columbia by the Consolidated Mining and Smelting Company of Canada, Ltd.

According to the "Mineral Industry" the chief producers of bismuth are the United States, Bolivia and Spain; Canada started production on an increased scale in 1928 and Peru in 1929. In Spain and Bolivia bismuth ores are mined; in the other countries the metal is recovered as a by-product in the smelting and refining of other ores. It was recently reported that new bismuth deposits have been discovered in the Jalisco State of Mexico.

China has recently produced considerable bismuth ore in Kwang-Si, Kiang-Si and Kwang-Tung with smaller quantities in Hunan and the discovery of high grade deposits of bismuth in Namaqualand, South Africa, has been reported.

The chief uses of bismuth are in the manufacture of pharmaceutical chemicals and in low melting alloys.

Imports of metallic bismuth into Canada during 1933 amounted to 180 pounds valued at \$198 as compared with 5 pounds at \$9 in 1932. Imports of bismuth salts in 1933 totalled in value \$25,255 as against \$21,229 in 1932.

Bismuth prices, per pound, f.o.b. New York, in ton lots, \$1.20. London, 4s. 6d. (September, 1934).

Table 125.—World Production* of Bismuth, 1931-1933

(Supplied by *Imperial Institute*)

(Cwt.—112 pounds)

Producing country and description	1931	1932	1933
BRITISH EMPIRE			
Canada—metal and content of bullion.....	1,055	150	699
India—(ore).....	lb. 42	lb. 27	lb. 80
Australia—(ore, etc.).....	792	385	50
FOREIGN COUNTRIES			
Germany (Saxony)—(Bismuth, cobalt-nickel-ore).....	1,299	2,154	(a)
Spain—(ore).....	2,244	650	(a)
(metal).....	531	669	(a)
Mexico—ore (bi-content).....	.....	343	923
Bolivia (exports)—(Content of ore and concentrates).....	523	46	37
Peru—(metal).....	60	1,568	5,756
China—(ore).....	2,620	(a)	(a)
Japan—(metal).....	1,115	938	(a)

*Bismuth is also recovered as a by-product in the United States and the United Kingdom.

(a) Information not available.

CADMIUM

Cadmium was produced in Canada for the first time in 1928 at the Trail refinery of the Consolidated Mining and Smelting Company, Limited, as a by-product in the refining of zinc.

Cadmium production in Canada in 1933 totalled in value \$78,733 as compared with \$26,824 in 1932. The output in both years originated entirely in the zinc refining operations of the Consolidated Mining and Smelting Company at Trail, B.C. The company reported that its cadmium plant was operated intermittently to suit the market.

At Flin Flon, Manitoba, the Hudson Bay Mining and Smelting Company, Ltd., produced, as a necessary part of the operation of the zinc plant, zinc plant residue and so-called cadmium precipitate. These were stocked for future treatment. The total amount of cadmium precipitate on hand at the end of 1933 totalled 4,296 tons, the average assays of this were zinc, 52.4 per cent, cadmium, 3.9 per cent, and copper, 7.19 per cent.

The world's cadmium production comes almost entirely from the residues of electrolytic zinc and lithopone plants. Production of metallic cadmium in the United States in 1933 amounted to 2,276,933 pounds, an increase of 185 per cent over 1932. In addition to metallic cadmium, United States manufacturers reported production of cadmium sulphide, cadmium oxide, cadmium lithopone and cadmium selenide.

Cadmium has obtained a strong position as a plating metal, especially in the automobile industry. The metal is also used in silver, gold, copper and fusible alloys and in the manufacture of pigments. Cadmium compounds also find various uses in the chemical industries.

It was reported early in 1934 that the electrolytic zinc works in Ridder have made the first delivery of Russian cadmium. Announcement was made in January that the possibility of a direct dry process for the production of cadmium red was investigated at Munich—namely, by heating mixtures of cadmium carbonate, sulphur and selenium. On raising the temperature to 450° C. exothermic re-action resulted with the production of red pigment.

Cadmium prices were quoted in September, 1934, by "Metal and Mineral Markets": per pound, f.o.b. New York, 55 cents. London, 1s. 1½d. nominal.

Table 126.—World Production of Cadmium, 1931-1933

(Supplied by *Imperial Institute*)

(Lb. avdp.)

Country	1931	1932	1933
BRITISH EMPIRE			
Canada.....	323,139	122,822 (c)	246,041
Australia.....	445,158	354,620	357,313
FOREIGN COUNTRIES			
Belgium (exports).....	6,400	51,400	183,400
France.....	181,167	274,451	355,000
Italy.....	17,600	13,752	15,700
United States—			
Metal.....	1,020,535	799,501	2,276,933
Compounds (metal content).....	337,200	259,800	401,400
Mexico (b).....	70,175	189,981	2,848,079

Cadmium is also produced in Germany, U.S.S.R. (Russia), Norway, Poland, Sweden and South West Africa, but statistics are not available.

(b) Including cadmium content of glue dust, etc., exported for treatment.

(c) Excluding cadmium sponge produced at Flin Flon, Manitoba.

CALCIUM

Calcium, as a metal, and in alloys with copper, lead, silicon and aluminium, is finding outlets in the ferrous and non-ferrous metal industries. It is used as an addition agent for the removal of such impurities as oxygen, carbon, chlorine, sulphur and phosphorus in the casting of metals, and the use of calcium in the refining of lead made it possible to remove bismuth from lead without electrolytic refining. Small percentages of calcium, along with barium, have been used for several years as a hardening agent for lead in bearings, and a lead-calcium alloy has recently been developed for use as a cable sheathing. Normal production is about twenty tons a year. The recent price for the metal of 98·5-99 per cent purity was about \$1.50 per pound (United States), in 10 pound cans or 100 pound cases. (The Mineral Industry). Metallic calcium is not produced in Canada at the present time.

CHROMIUM

The mineral chromite (FeO , Cr_2O_3) is the commercial source of the metal chromium which is of prime importance in the manufacture of chrome steel armour plate and other similar steels. Chromium is a necessary constituent of many high-speed cutting tools, and its use is well established in the manufacture of stainless steels, in which it makes up from 12 to 14 per cent or higher of the alloy. Production of chromite in Canada for 1932 amounted to 78 tons valued at \$1,113 and constitutes the first output of this mineral in the Dominion since 1929. The entire 1932 output came from the Thetford Mines area in the province of Quebec. Chromite deposits located a few miles north of Clinton, British Columbia, were under development in 1932; in 1933 the total output in the Dominion amounted to only 30 tons valued at \$343. The mineral in both years was mined in the Eastern Townships of Quebec.

In 1932 chromite deposits, located a few miles north of Clinton, British Columbia, were under development and considerable work of an exploratory nature was recently conducted on chromite occurrences in the Obonga Lake area, situated some miles north of the city of Port Arthur, Ontario. The company operating at Obonga Lake has announced the intention to construct a mill and concentrator of 75 tons daily capacity.

The "Mining Journal," London, remarks that the Southern Rhodesia chromite deposits at Selukwe are apparently not approached in magnitude by any other known single source of ore. The other important occurrences of chromite include the New Caledonian deposits (largely depleted), the Indian occurrences in Mysore and Baluchistan, the Transvaal, and Russia. The British Empire not only contains the largest producing chromite mine at Selukwe but probably the largest potential supply in the chromite occurrences of the Transvaal and in the Great Dike in Southern Rhodesia, both of which so far have only been very partially developed.

The three principal uses for chromite are: (1) for the production of ferro-chromium; (2) for the production of bichromates and other chemical compounds of chromium, and recently the chemicals used in electro-plating with chromium, and (3) as a refractory.

"The Mineral Industry" reports that stainless steel (chromium alloy) continues to gain ground in the processing and transportation of food products by reason of freedom from corrosion, etc. For associated reasons a great variety of stainless equipment is already used by hotels, restaurants and hospitals, etc. Through recent advances in heat treatment the physical properties of the various chromium-nickel stainless steels have been enhanced without sacrifice of stainlessness. The automobile industry continues to remain one of the largest consumers of chromium steels.

A study of the production of chromium salts by the direct chlorination of chrome ore has been made recently, reports the "Chemical Trade Journal," London. The chromium chloride formed melts at the temperature used and partly vaporizes, depositing in the cooler part of the vessel as crystals. One part of mineral requires 0.5 parts by weight of chlorine corresponding to a chlorine consumption of two tons per ton of chromium chloride produced. Ferric chloride can also be recovered for use in the manufacture of electrolytic iron.

It was reported from Moscow in February, 1934, that a large, modern ferro-chrome plant was being built at Cheliabinsk, in East Russia. The works are described as the largest of their kind in the world and will commence operating in December of the current year.

Chrome ore prices were quoted by "Metal and Mineral Markets" in September, 1934, as follows:—per long ton, c.i.f. Atlantic ports, Indian ores, \$15.50 to \$16.50 for 45 to 47 per cent Cr_2O_3 ore, and \$20.50 to \$21.50 for 50 to 51 per cent ore. Russian ores: 45 per cent Cr_2O_3 , \$16; 48 per cent, \$18. London, 80s. to 85s. for 48 per cent Rhodesian, and 100s. for 55 to 57 per cent New Caledonian. Ferrochrome—per pound of contained chromium 4 to 6 per cent carbon, 66 to 70 per cent chromium, 10 cents, delivered; on contracts; spot 10 cents to 10.5 cents. Chromium per pound, 97 per cent grade spot, 93 cents.

Table 127.—Production of Chromite in Canada, 1924-1933

Year	Short tons	Value
		\$
1924-1928.....		
1929.....	126	900
1930.....		
1931.....		
1923.....	78	1,113
1933.....	30	343

NOTE.—For years 1886 to 1923 see previous reports.

Table 128.—Production in Canada of Chromite, and Imports of Chromium Products, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION.....			78	1,113	30	343
IMPORTS—						
Bichromate of soda.....	805	114,793	1,096	128,717	929	87,558
Bichromate of potash.....	65	11,656	65	12,586	57	9,013
Brick, fire, chrome.....		48,230		9,848		38,431
Nickel-chromium in bars or rods containing more than 60 per cent nickel and 10 per cent chromium for the manufacture of electrical resistance wire.....	22	45,033	21	46,443	25	46,210

Table 129.—World Production of Chrome Ore, 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Southern Rhodesia.....	80,334	15,445	34,493	Cuba.....	11,882	500	21,837
Union of South Africa.....	22,966	19,065	33,541	United States.....	762	200	966
Cyprus (c).....	200	1,000	.....	Roumania.....	.....	.....	29
Canada.....	.....	70	27	French Indo-China.....	2,736	.....	.....
India.....	19,913	17,865	15,526	Japan.....	9,573	12,295	19,681
Australia.....	26	97	891	Turkey.....	29,059	54,344	74,188
				New Caledonia.....	72,979	68,332	49,100
Total.....	123,000	54,000	85,000	Total (b).....	190,000	176,000	193,000
FOREIGN COUNTRIES				World's Total (b)....			
Greece.....	5,545	1,530	(a)		313,000	230,000	278,000
Yugoslavia.....	57,462	38,523	25,062				
Norway.....	.....	403	321				

(a) Information not available.

(b) Excluding U.S.S.R. (Russia)—figures for which are not available.

(c) Estimates.

IRON ORE

Iron ore was first discovered in Canada in the St. Maurice valley, Quebec, as early as 1667, or perhaps earlier. Count Frontenac mined ore there five years later and the samples, tested in France, were found to be of workable quality.

In 1730 M. Franchville was granted a licence by Louis XIV of France together with a subsidy of 10,000 "livres" to work the St. Maurice iron mines. The project contemplated the construction of a blast furnace which apparently was not successful, for, in 1735, he surrendered his rights to the government. Some years later another licence and a subsidy were given La Compagnie des Forges which made not only the iron kettles that were needed by the pioneers for making sugar and soap but furnished the French government with cannon for military enterprises. In 1743 the plant again reverted to the crown and was operated by the government until the country passed into the hands of the British.

Nova Scotia, with its large iron and steel industry, is not at present a producer of iron ore. The large deposits of high-grade ore in Newfoundland owned and operated by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia and for that reason the local deposits are not mined.

Iron ore mining and smelting were carried on to a small extent in New Brunswick but the ore was low-grade and the operations did not prosper.

Iron ore was first mined and smelted in the province of Quebec early in the eighteenth century, and from that time until 1883 the industry was carried on almost continuously at Three Rivers in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and at Drummondville, the last to shut down being the Drummondville furnace in 1911. The ores used were bog ores, with charcoal for fuel. The output of all the furnaces was small and the industry owed its success to the superior quality of the pig iron produced.

Furnaces have also been built at various times and places in attempts to smelt some of the other classes of ore found in the province; these were all short lived, and none achieved commercial success.

In northwestern Ontario about 1899, a deposit of hematite, that later developed into the Helen mine, was found, this mine proved the main source of Ontario's iron output for a number of years. The high grade ore was exhausted and the mine is now closed down. Ontario has a large supply of low-grade iron ore, but beneficiation processes must be applied to make these ores suitable for commercial use.

Production of iron ore in British Columbia has been almost negligible up to the present time, however, the small production has not been caused so much by the lack of ore as by the scarcity of a market for the ore.

There are no known large bodies of high-grade iron ore in Canada that could be made tributary to present Canadian furnaces. There are, however, two very large partly developed, but unequipped deposits of low-grade ore in Ontario. The Algoma Steel Corporation's New Helen mine in the Michipicoten district has proved reserves variously estimated at 60,000,000 to 80,000,000 tons of low-grade rather sulphury iron carbonate that requires roasting to fit it for use in the blast furnace. A similar ore was formerly worked by the same company at their Magpie mine, also in the Michipicoten district, but this is not at present profitable. In the Sudbury district, Moose Mountain, Ltd., have developed some 33,000,000 tons of proved and probable ore, consisting of low-grade siliceous magnetite carrying in its natural state about 35 per cent of iron. For a number of years it was attempted to work the Moose Mountain ore by a process of magnetic separation and sintering, but in spite of the exceptionally high-grade of the finished product it was found impossible to bring costs down to the point where a profit could be made in competition with available natural ores of foreign origin.

Table 130.—Shipments of Iron and Titanium Ores from Canadian Mines, by Provinces, 1924-1933

(For years 1886 to 1923 see Mineral Production of Canada, 1928)

(Short tons)

Year	Quebec	Ontario	British Columbia	Canada
1924.....	1,408	44	28	1,480
1925*.....	3,978			3,978
1926.....	200			200
1927.....	2,029			2,029
1928.....	2,244			2,244
1929.....	2,748			2,748
1930.....	412			412
1931.....	1,509			1,509
1932.....				
1933.....				

*1925-1933—shipments consist of titaniferous ore.

Table 131.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1924-1933

(For years 1895 to 1923 see Mineral Production of Canada, 1928)

Year	To Nova Scotia	To United States	To Europe	Total shipments
	Short tons	Short tons	Short tons	Short tons
1924.....	174,602		919,968	1,094,570
1925.....	384,795		883,056	1,267,851
1926.....	465,961		503,640	969,601
1927.....	480,757	68,354	946,569	1,495,680
1928.....	690,316	41,493	1,001,833	1,733,642
1929.....	763,168	85,501	850,370	1,699,039
1930*.....	523,918	54,623	740,774	1,319,315
1931.....	234,148	25,670	550,079	789,897
1932*.....			166,303	166,303
1933.....			254,383	254,383

*European shipments in 1930 and 1932 were to Germany only.

Table 132.—Imports into Canada, and Exports of Iron Ore, 1932-1933

	1932		1933	
	Quantity	Value	Quantity	Value
	Short tons	\$	Short tons	\$
IMPORTS—				
Iron ore from United States.....	59,449	146,763	176,261	343,395
Iron ore from French Africa.....			21,627	42,706
Iron ore from other countries.....	8,118	37,600	7,815	14,646
Total.....	67,567	184,363	205,703	400,747
EXPORTS—Total.....	720	2,354	1,774	1,563

Table 133.—World Production of Iron Ore (including Manganiferous Iron Ore)

(Supplied by Imperial Institute)

(Long tons)

Country	Ore			Estimated iron content		
	1931	1932	1933	1931	1932	1933
BRITISH EMPIRE						
Great Britain (b)	7,625,860	7,328,190	7,461,720	2,364,000	2,198,500	2,238,516
Northern Rhodesia	759	711		266	464	
Southern Rhodesia	526			150		
S.W. Africa	21,863			(a)		
Sierra Leone			24,550			16,000
Union of South Africa	15,203	31,196	67,496	5,911	11,140	24,609
Newfoundland	537,210	817,855	(c) 270,500	279,000	165,000	140,000
India	1,624,833	1,760,501	1,228,625	1,040,000	1,130,000	790,000
Unfederated Malay States	691,986	688,179	766,472	441,000	440,000	491,000
Australia	297,400	546,160	729,738	196,000	360,000	482,000
New Zealand	6,920		6,572	3,700		3,600
Total	10,800,000	10,700,000	10,500,000			
FOREIGN COUNTRIES						
Portugal			4,400			2,100
Austria	503,859	301,951	262,814	178,475	105,419	92,554
Belgium	123,833	91,344	(a)	56,000	41,000	(a)
Czechoslovakia	1,215,572	592,704	422,000	388,153	192,786	136,965
France	37,949,670	27,322,882	29,728,996	13,000,000	9,000,000	10,000,000
Germany	2,579,900	1,318,600	2,550,513	828,243	435,736	815,316
Greece	232,289	45,295	(a)	102,100	20,600	(a)
Hungary	82,706	52,029	49,231	29,068	18,054	17,942
Italy	565,676	417,368	517,294	278,600	209,546	260,000
Yugoslavia	131,304	26,215	50,925	68,303	13,737	26,685
Luxemburg	4,689,671	2,161,879	3,309,312	1,434,296	983,050	1,019,480
Norway	565,807	368,002	466,379	372,232	241,044	304,476
Poland	280,157	75,901	158,124	73,000	20,000	50,000
Egypt		25		(a)		
Roumania	60,929	7,924	13,613	27,000	3,600	6,100
Russia	10,444,600	12,000,000	14,000,000	(a)	(a)	(a)
Spain	3,139,818	1,732,667	1,786,811	1,480,000	790,000	830,000
Sweden	6,959,193	3,246,886	2,656,127	4,275,000	2,000,000	1,659,000
Switzerland (exports)	33,698	11,675	6,977	(a)	(a)	(a)
Algeria	886,622	459,560	749,428	440,000	230,000	375,000
Belgian Congo	19,000			(a)		
Morocco (Spanish)	537,855	168,479	507,692	300,000	93,000	279,000
Morocco (French)	1,000			500	(a)	(a)
Tunis	435,600	206,000	286,000	225,000	106,000	148,000
Cuba	223,218	185,248	275,197	102,700	85,200	126,600
Mexico	64,000	26,694	76,486	41,000	17,000	48,950
United States (d)	31,412,916	9,872,350	17,744,819	15,700,000	4,900,000	8,800,000
Brazil (estimated)	30,000	30,000	30,000	20,000	20,000	20,000
Chile	729,937	168,420	556,246	433,291	111,000	344,316
China	1,460,061	1,232,816	1,260,000	580,000	490,000	500,000
Japan	204,893	223,141	(a)	(a)	(a)	(a)
Korea	157,000	149,022	254,188	86,000	82,000	87,000
Turkey	492	(a)	(a)	(a)	(a)	(a)
French Indo China			404			222
Manchoukuo	948,311	1,025,162	1,158,060	470,000	510,000	580,000
Total	106,000,000	64,000,000	77,000,000			
World's Total	117,000,000	75,000,000	88,000,000			

(a) Information not available.

(b) In addition bog ore and iron ore (not used for smelting) were produced as follows:—

1931	10,281 long tons.
1932	9,533 "
1933	8,256 "

(c) Shipments from mines.

(d) Including shipments of manganiferous iron ore up to 35 per cent mn.

PIG IRON AND FERRO-ALLOYS, STEEL AND ROLLED PRODUCTS

Statistics of pig iron, steel and rolled products, are regarded as belonging to "Manufacturing" rather than to "Mining" but the close relation between the mining of iron ore and the production of pig iron and steel justifies the inclusion here of references to these secondary industries. The data given in this section have been taken from the Bureau's annual bulletin on *The Primary Iron and Steel Industry in Canada, 1933*.

Statistics for the primary iron and steel industry cover the operations of plants engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and direct steel castings, (d) rolled and drawn iron and steel products, such as bars, plates, sheets, strips, rails, wire rods, structural shapes, etc. Thirty-six firms were included in this industry in 1933 and reports were received for 50 different plants or departments, including 4 blast furnace departments, 2 ferro-alloy plants, 26 steel furnace divisions and 18 rolling or drawing mills.

Factory sales of pig iron, steel and rolled products were valued at \$18,492,549 in 1933 compared with \$16,197,526 in 1932 and \$36,911,245 in 1931. The 22 works in Ontario accounted for 63 per cent of the total sales for Canada, 6 plants in Nova Scotia provided 20 per cent of the total and 14 works in Quebec accounted for 14 per cent. There were also 4 operating plants in Manitoba, 1 in Alberta and 3 in British Columbia.

Capital employed in 1933 was reported at \$96,444,846 of which \$74,536,432 or 77.4 per cent represented the value of land, buildings and plant equipment. The total for Ontario was \$64,821,820; for Nova Scotia, \$18,380,730; for Quebec, \$11,773,013; for Manitoba, \$1,342,983; and for Alberta and British Columbia, \$126,300.

The average number of employees in the primary iron and steel plants was 5,200 in 1933 compared with 4,847 in 1932 and 8,026 in 1931. About 315 workers were employed in blast furnace departments, 209 in ferro-alloy plants, 1,467 on steel furnaces and 3,207 in rolling mills. Salaries and wages in 1933 totalled \$6,049,189 compared with \$6,131,057 in 1932 and \$11,072,054 in 1931.

(a) Pig Iron.—Production of pig iron in Canada during 1933 totalled 227,317 long tons compared with 144,130 tons in 1932 and 420,038 tons in 1931.

Imports of pig iron during 1933 amounted to 2,459 long tons, a decline of over 48 per cent from the total of 4,753 tons brought in during 1932. Exports were recorded at 11,903 long tons as compared with 2,029 tons in the previous year.

Furnace charges in 1933 included 400,290 long tons of imported ore, 17,992 long tons of mill cinder, etc., 10,879 long tons of scrap, 132,235 short tons of limestone, and 247,974 short tons of coke.

The stocks of pig iron held by the producers at the end of 1933 totalled 109,507 long tons compared with a carryover from 1932 of 117,460 tons.

The four producers of pig iron in Canada have 11 blast furnaces available for use, which, if operated at capacity, could produce 1.5 million tons of pig iron per year. Actual production in 1933 totalled 227,317 tons or about 15 per cent of the rated capacity.

(b) Ferro-Alloys.—Production of ferro-alloys during 1933 amounted to 30,133 long tons compared with 16,161 tons in 1932.

In 1933 ferrosilicon was recovered as a by-product by 3 manufacturers of fused alumina; 1 chemical manufacturer made some ferro-phosphorus; 1 producer of pig iron made spiegeleisen in the blast furnace; and 1 large manufacturer of ferro-alloys made ferrosilicon, spiegeleisen and calcium silicon.

(c) Steel Ingots and Castings.—Steel production advanced 21 per cent in 1933 to 409,979 long tons compared with 339,346 tons in 1932. The 1933 output included 394,059 tons of ingots and 15,920 tons of castings. Practically all of the ingots were transferred to the producers' own rolling mills but only 916 tons of castings were for the producers' own use. Sales of castings amounted to 14,876 tons at \$2,363,226 and sales of ingots were reported at 58 tons valued at \$1,945.

Twenty-six steel plants were in operation during 1933 of which 10 were in Quebec, 7 in Ontario, 3 in Manitoba, 2 in Nova Scotia, 3 in British Columbia, and 1 in Alberta. Four of these concerns operated basic open hearth furnaces only, 18 used electric furnaces only, 2 used

both basic open hearth and electric furnaces and 2 used converters. Six concerns made basic open hearth steel ingots, 3 made electric ingots, 18 made electric steel castings, 4 made basic open hearth castings and 2 made converter castings. These plants reported steel furnace equipment as follows: 41 basic open hearth furnaces with a total daily capacity of 5,090 long tons; 4 converters with total capacity of 1,252 tons per day and 27 electric furnaces with total capacity of 561 tons. Two plants were idle during the year, 1 electric furnace in Ontario and 1 basic open hearth furnace in Alberta, their combined capacity being about 87 tons of steel per day.

(d) Rolled and Drawn Steel.—Fifteen plants made hot rolled products; 1 made cold rolled strips and 2 produced cold drawn shapes in 1933. Sales from these works were valued at \$13,876,661 in 1933 compared with \$12,564,130 in 1932. During the year 419,000 tons of iron and steel passed through the mills and 413,000 tons of this came from the producers own works.

Table 134.—Principal Statistics of the Primary Iron and Steel Industry in Canada, 1929-1933

Years	No. of plants	Capital employed	Average number of employees	Salaries and wages	*Cost of materials at works	Selling* value of products at works	Value added by manufacturing
		\$		\$	\$	\$	\$
1929.....	45	109,446,529	11,218	18,534,681	32,514,596	72,231,995	39,717,399
1930.....	49	112,079,926	9,723	14,934,325	22,765,648	52,588,935	29,823,287
1931.....	53	104,512,104	8,026	11,072,054	15,291,414	36,911,245	21,619,831
1932.....	52	96,323,629	4,847	6,131,057	6,289,483	16,197,526	9,908,043
1933—							
Nova Scotia.....	6	18,380,730	768	903,066	2,276,878	3,763,242	1,486,364
Quebec.....	14	11,773,013	1,194	1,003,807	722,481	2,553,091	1,830,610
Ontario.....	22	64,821,820	2,966	3,890,856	4,430,511	11,584,786	7,154,275
Manitoba.....	4	1,342,983	238	220,168	147,028	479,578	332,550
Alberta and British Columbia.....	1 3	126,300	34	31,292	22,033	111,852	89,819
Canada.....	50	96,444,846	5,290	6,049,189	7,593,931	18,492,549	10,893,618

*Figures of materials used are of purchased materials only, and production figures cover sales only.

Table 135.—Materials Charged to Iron Blast Furnaces in Canada, 1933

Materials	Quantity	Cost at furnace
		\$
Foreign iron ore.....long tons	400,290	1,378,198
Mill cinder, scale, etc.....long tons	17,992	57,343
Scrap (net charge).....long tons	10,879	92,421
Limestone—		
From Canadian quarries.....short tons	21,888	28,477
From foreign sources.....short tons	110,347	140,501
Coke made in Canada—		
From Canadian coal.....short tons	135,323	803,659
From imported coal.....short tons	80,500	388,211
Imported coke.....short tons	32,151	164,378
Other materials.....xxx		63,052
Total.....xxx		3,116,249

Table 136.—Production of Pig Iron and Sales by the Canadian Producers, 1933

Grades	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Selling value at works
	Long tons	Long tons	Long tons	\$
Basic.....	189,428	151,976	15,648	272,600
Foundry.....	22,333	234	39,361	732,337
Malleable.....	15,556	2,029	21,498	397,966
Total.....	227,317	154,239	76,507	1,402,903

Table 137.—Production of Ferro-Alloys in Canada, 1924-1933

	Long tons		Long tons
1924.....	35,034	1929.....	89,116
1925.....	25,709	1930.....	65,223
1926.....	57,060	1931.....	46,764
1927.....	56,230	1932.....	16,161
1928.....	44,482	1933.....	30,133

Table 138.—Materials Used in the Steel Ingots and Direct Steel Castings Industry in Canada, 1933

Materials	Companies' own production	Purchased materials	
		Quantity	Cost at furnace
	Long tons	Long tons	\$
(a) Metals:—			
Pig iron.....	154,827	2,135	46,450
Spiegeleisen and ferromanganese.....		4,157	208,046
Ferrosilicon.....		2,748	115,319
Other ferro-alloys.....		434	90,969
Metals for making alloy steels (nickel, etc.).....			95,604
Scrap iron or steel, including old rails not intended for re-rolling.....	600	213,396	1,418,420
Scrap made in works reporting.....	94,330		
Total metals.....			1,974,808
(b) Ores:—			
Crude iron ore—			
Foreign.....		17,740	121,010
Calcined, roasted, or treated ore—			
Foreign.....		80	928
Manganiferous ore—			
Foreign.....		198	3,203
Chrome, etc.—			
Foreign.....		133	2,564
Total ores.....		18,151	127,705
(c) General materials:—	Short tons	Short tons	
Limestone—			
Canadian.....		14,418	88,291
Foreign.....		20,114	27,567
Fluorspar.....		2,949	31,657
Dolomite.....		6,874	30,557
Coke made from Canadian coal.....		368	3,928
Coke made in Canada from imported coal.....		2,894	19,059
Imported coke.....		291	4,143
Anthracite coal.....		759	7,663
Bituminous coal.....		30	240
Charcoal.....		8,733	1,810
Electrodes.....			75,698
Moulding sands.....		8,960	56,607
Firebrick.....			34,694
Fireclay.....		2,904	25,365
Other materials.....			223,473
Total general materials.....			630,752
Total Value of Metals, Ores and General Materials used.....			2,733,265

Table 139.—Production of Steel Ingots and Direct Castings and Sales by the Canadian Producers, 1933

Grades	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Income from sales
	Long tons	Long tons	Long tons	\$
Steel Ingots—				
Basic open hearth.....	378,666	377,931	54	1,620
Electric.....	15,393	15,389	4	325
Direct Steel Castings—				
Basic.....	5,017	779	4,281	617,469
Bessemer, including all converters.....	288	27	261	61,335
Electric.....	10,615	110	10,334	1,684,422
Total.....	409,979	394,236	14,934	2,365,171

Table 140.—Materials Used in Canadian Iron and Steel Rolling and Drawing Mills, 1933

Materials	Companies' own make	Purchased materials	
		Quantity	Cost at mill
	Long tons	Long tons	\$
Steel, crude and semi-finished (ingots, blooms, billets, slabs).....	413,279	15,847	714,810
Rails, old and scrap.....	1,289	13,812	163,308
Axles, scrap.....		1,622	20,276
Iron muck and scrap bar.....	880	156	10,992
Iron and steel scrap.....	1,670	242	1,037
Hot rolled steel for cold rolling or drawing.....		5,010	252,872
All other iron and steel.....	1,770	3,759	187,814
All other materials.....			44,002
Total.....			1,395,111

Table 141.—Products Made in the Canadian Iron and Steel Rolling and Drawing Mills, and Sales by the Producers, 1933

Products	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Value
	Long tons	Long tons	Long tons	\$
Blooms, billets and slabs (except for forging).....	187,372	177,998	8,691	259,334
Rails.....	67,835	120	69,052	2,899,750
Structural shapes.....	16,153	56	15,974	740,200
Merchant bars, including spring steel, alloy steel, tool steel, rounds, squares, flats, (6 in. and under) except flats for cold rolling and bars for reinforcing concrete.....	56,474	6,949	56,667	3,241,735
Bars for reinforcing concrete.....	16,400	686	16,019	767,373
Wire rods, including chain rods.....	88,692	61,422	29,111	1,104,532
Spike rods, bolt and nut rods, horseshoe bars, and all other miscellaneous rolls (not forged) forms, not elsewhere specified.....	7,038	5,173	1,834	111,325
Cold rolled and cold drawn steel shapes.....	8,049		8,028	729,324
Rail fastenings, finished—				
Tie plates.....	4,071	1	4,074	229,942
Angle splice bars and fish plates.....	808	1	1,075	76,667
Forgings of iron or steel.....	3,279		3,151	221,661
Railway spikes and pressed spikes.....	2,918	104	2,857	200,992
Washers.....	279	62	199	27,592
Scrap iron and steel.....	1,205	334	925	4,515
Other products, including plain sheets, plates, galvanized sheets, horseshoes, etc., which were made by only 1 or 2 concerns in this industry and for which figures cannot be shown separately.....				3,261,719
Total.....				13,876,661

Table 142.—Production of Pig Iron, by Provinces, 1928-1933

(Long tons)

Years	Nova Scotia	Ontario	Total
1928.....	302,756	734,971	1,037,727
1929.....	310,801	769,359	1,080,160
1930.....	212,636	534,542	747,178
1931.....	101,393	318,645	420,038
1932.....	30,697	113,453	144,130
1933.....	118,514	108,803	227,317

Table 143.—Production of Pig Iron in Canada, by Grades, 1928-1933

(Long tons)

Years	Basic	Foundry	Malleable	Total
1928.....	724,559	233,386	79,782	1,037,727
1929.....	770,478	221,644	88,038	1,080,160
1930.....	494,231	193,074	59,873	747,178
1931.....	311,850	80,892	27,296	420,038
1932.....	105,058	25,246	13,826	144,130
1933.....	189,428	22,333	15,556	227,317

Table 144.—Production of Pig Iron, by Months, 1929-1933

(Long tons)

Months	1929	1930	1931	1932	1933
January.....	87,764	87,079	35,592	10,305	29,209
February.....	93,939	70,600	46,395	10,507	6,144
March.....	86,176	74,582	57,110	17,989	
April.....	79,341	72,339	53,792	16,898	
May.....	81,464	80,505	50,511	13,339	
June.....	89,873	66,081	55,822	8,163	857
July.....	99,786	64,676	40,303	7,317	31,689
August.....	112,528	57,459	23,212	5,992	35,233
September.....	98,816	49,395	17,585	5,709	30,738
October.....	91,409	40,079	11,562	6,731	27,002
November.....	86,516	46,360	14,292	14,149	29,592
December.....	72,548	38,023	13,862	27,031	36,853
Total.....	1,080,160	747,178	420,038	144,130	227,317

Table 145.—Production of Steel Ingots and Direct Steel Castings, by Grades, 1928-1933

Years	Steel ingots		Direct steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Converter	Electric	
1928.....	1,189,399	602	20,109	2,019	22,590	1,234,719
1929.....	1,295,162	14,444	35,806	2,590	30,022	1,378,024
1930.....	925,427	31,461	24,772	2,314	25,604	1,009,578
1931.....	612,437	25,017	14,760	590	19,305	672,109
1932.....	308,700	19,670	2,616	846	7,514	339,546
1933.....	378,666	15,393	5,017	288	10,615	409,979

Table 146.—Production of Steel Ingots and Direct Castings, by Months, 1929-1933

(Long tons)

Months	1929	1930	1931	1932	1933
January.....	116,260	115,200	57,598	25,060	40,766
February.....	117,445	106,612	82,637	28,469	12,374
March.....	137,158	117,487	99,341	43,572	11,212
April.....	122,102	102,681	91,461	36,030	11,384
May.....	126,372	99,312	75,235	29,239	23,126
June.....	119,505	95,321	55,605	18,118	31,602
July.....	129,827	68,424	45,097	27,506	49,076
August.....	120,282	57,626	52,491	26,710	48,659
September.....	99,000	55,808	33,390	23,139	38,630
October.....	115,674	65,431	30,926	17,102	48,496
November.....	93,648	71,740	28,337	37,088	43,099
December*.....	80,751	53,936	19,991	27,313	51,555
Total.....	1,378,024	1,009,578	672,109	339,346	409,979

*Slight errors in monthly production figures have been compensated in December totals.

Table 147.—World Production of Pig Iron and Ferro-Alloys, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1932
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	3,772,600	3,574,000	4,136,000	Italy.....	544,825	487,192	557,746
Union of S. Africa.....	10,223	14,272	26,000	Yugoslavia.....	37,138	9,815	29,238
Canada.....	466,802	160,291	257,450	Luxemburg.....	2,020,672	1,929,232	1,857,727
India.....	1,072,702	913,314	1,057,837	Netherlands.....	252,662	232,682	248,655
Australia (b).....	232,783	190,132	336,246	Norway.....	116,960	96,156	104,337
New Zealand.....	3,460		3,286	Poland.....	341,632	195,536	300,798
Total.....	5,600,000	4,900,000	5,800,000	Roumania.....	25,485	8,614	1,992
FOREIGN COUNTRIES				U.S.S.R. (Russia).....	4,794,000	6,075,000	7,015,000
Austria.....	142,726	92,974	86,560	Spain.....	471,646	295,870	338,501
Belgium.....	3,147,285	2,705,327	2,711,056	Sweden.....	410,912	277,707	340,069
China.....	133,621	145,941	164,704	Mexico.....	52,090	20,059	26,100
Czechoslovakia.....	1,146,331	442,997	491,099	United States.....	18,426,354	8,781,453	13,345,602
Finland.....	12,134	13,455	(a)	Brazil.....	37,333	32,825	50,000
France—				Japan.....	919,434	1,020,304	1,433,866
Saar.....	1,491,495	1,328,180	1,566,586	Manchuria.....	336,864	362,366	427,000
Other districts.....	8,076,526	5,449,954	6,224,340	Korea.....	143,000	161,068	161,348
Germany.....	5,965,342	3,870,258	5,183,588	Philippine Islands.....	160	(a)	(a)
Hungary.....	157,109	65,234	91,602	Total.....	49,100,000	34,000,000	42,600,000
				World's Total.....	54,700,000	38,900,000	48,400,000

(a) Information not available.

(b) Years ended June 30.

Table 148.—World Production of Steel Ingots and Castings, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	5,202,600	5,261,440	7,024,000	Latvia.....	7,075	336	1,336
Union of South Africa (b)...	42,663	42,542	9,000	Norway.....	1,802	(a)	(a)
Canada.....	672,109	339,346	409,979	Luxemburg.....	2,002,814	1,924,688	1,815,694
India.....	625,148	569,810	694,073	Poland.....	1,020,589	542,056	804,145
Australia (c).....	228,363	221,488	392,666	U.S.S.R. (Russia).....	5,525,000	5,828,400	6,727,000
Total.....	6,800,000	6,400,000	8,500,000	Spain.....	635,174	523,995	498,651
FOREIGN COUNTRIES				Sweden.....	530,453	519,835	619,913
Austria.....	317,266	201,284	222,230	Mexico.....	84,162	57,215	75,000
Belgium.....	3,056,049	2,745,719	2,698,900	United States.....	25,945,501	13,681,162	23,232,347
Czechoslovakia.....	1,490,159	660,846	722,898	Japan.....	1,853,383	2,360,404	3,145,660
France—				China (estimated).....	30,000	30,000	30,000
Saar.....	1,514,050	1,440,316	1,649,798	Brazil.....	28,192	47,492	(a)
Other districts.....	7,698,095	5,550,957	6,427,754	Roumania.....	111,469	101,000	142,479
Germany.....	8,047,129	5,535,254	7,465,916	Total.....	61,600,000	43,300,000	58,200,000
Hungary.....	311,297	177,000	224,067	World's Total.....			
Italy.....	1,387,090	1,374,129	1,743,163		68,400,000	49,700,000	66,700,000

(a) Information not available.

(b) Including rails, fishplates, etc.

(c) Years ending June 30.

LITHIUM

Lithium-bearing minerals are reported to occur in commercial quantities at Lac du Bonnet in southeastern Manitoba. Shipments of lithium ore have been made from this district during recent years, chiefly for experimental work. No Canadian production was reported in 1933. The largest consumer of lithium minerals is probably the glass industry; lithium salts are used in medicine and the chloride in the manufacture of fireworks and signal lights. The hydroxide is used for prolonging the life of alkaline accumulators.

Metallic lithium when alloyed with magnesium produces an alloy of specific gravity 1.4 and very light alloys of these two metals have recently been produced for aeronautical purposes. Research in Germany has resulted in the production of a series of beryllium-lithium alloys which are stated to have industrial application. It was recently announced in Europe that lithium chloride and lithium alloys are again being manufactured at the Hans-Heinrich, Hutte, Langesheim, which closed down last year owing to accumulation of stocks. Metallic lithium was quoted at New York in September, 1934, per pound, 98 to 99 per cent, 100 pound lots, \$15.00. Lepidolite, per ton, \$20 to \$25 for ordinary grades.

MAGNESIUM

Metallic magnesium is not produced in Canada. In the United States the quantity of magnesium ingot sold or used in 1933 was 1,434,893 pounds valued at \$377,181 compared with 791,699 pounds valued at \$228,653 in 1932, according to reports furnished by the Bureau of Mines, Washington, D.C. This represents an increase of 81 per cent in quantity and 65 per cent in value compared with 1932. In 1933 as in the five preceding years the United States output of primary magnesium was all obtained from magnesium chloride recovered as a joint product of the salt wells of the Dow Chemical Company near Midland, Michigan.

No figures are available to show the actual world production of magnesium. "The Mining Journal," London, states that the output probably does not exceed a few thousand tons annually and the largest producers and users of magnesium metal are Germany and the United States. The production in Great Britain is not made public but it is believed to be quite small. In Germany the raw material from which the metal is obtained by electrolysis from a fused electrolyte is magnesium chloride. It is claimed by a German authority that magnesium can be produced today at a less cost than aluminium. Magnesium in the un-alloyed condition has a number of uses and is familiar in the form of thin ribbon or wire as flashlights in photography and fireworks. A much more extensive use of the metal is its employment as a deoxidiser of

other metals, notably nickel. But it seems, the London Journal comments, that the future use of the metal will be mainly in the form of light alloys. The specific gravity of magnesium is 1.74, compared with 2.67 for aluminium.

Magnesium metal in the form of shavings has been proposed (Chemical Age, London) for water treatment filters. It simultaneously dechlorinates highly chlorinated water, removes free carbonic acid and imparts the alkaline reaction desirable in boiler feed water.

Magnesium metal prices, New York, as quoted by "Metal and Mineral Markets" in September, 1934, were: per pound, ingots (4 x 16 in.), 99.8 per cent, 30 cents, in carloads.

MANGANESE

No Canadian manganese ores have been mined or sold in Canada since 1931. The manganese ores which have been mined in Eastern Canada are pyrolusite, manganite, psilomelane and bog manganese, states the Department of Mines, Ottawa. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were obtained mainly from New Ross in Lunenburg county, Loch Lomond, Cape Breton, and Aylesford, Kings county, all in Nova Scotia; in New Brunswick at Dawson Settlement and Turtle Creek, Albert county, and from Markhamville, Kings county. Manganiferous ores have also been mined in British Columbia.

The principal manganese producing countries of the world are, normally, Brazil, India, Russia, the Gold Coast of Africa, Union of South Africa, Egypt and Czechoslovakia. The "Mineral Industry" reported in 1933 that manganese alloys, especially steels and bronzes, retain their importance. A recent innovation is the substitution of manganese for nickel in the so-called 18-8 chromium-nickel alloy of steel of the stainless type. Small variations in the proportions of the constituents give a range of materials suitable either for castings or for smithing.

Russian manganese ore continued to dominate the world markets again in 1933. The Russian practice is to sell manganese ore at whatever price it will bring in order to obtain markets, reports the "Mineral Industry." Production of manganese ore was resumed in South Africa during 1933, a considerable tonnage being shipped from Durban, mostly to Canada; ferro-manganese was also produced successfully at the Newcastle furnace of the Union Steel Corporation.

Imports into Canada of ferro-manganese and silico-manganese, containing more than 30 per cent by weight of manganese totalled 4,835 cwt. valued at \$31,611 in 1933 compared with 1,532 cwt. at \$4,732 in 1932. Imports of manganese oxide totalled 686,842 cwt. valued at \$293,910 as against 30,249 cwt. worth \$87,644 during 1932. No manganese ore was exported in 1933.

Prices for manganese ore, September, 1934, were: per long ton unit of Mn., c.i.f. North Atlantic ports, cargo lots, exclusive of duty: Brazilian, 46 to 48 per cent Mn., 23 cents; Chilean, 47 per cent minimum, 25 to 26 cents; Indian, 48 to 50 per cent, 24 cents; Caucasian, 52 to 55 per cent, 24 cents nominal; South African, 49 to 51 per cent, 23 cents; 44 to 48 per cent, 22 cents.

Table 149.—Production of Manganese Ore in Canada, 1923-1933

Year	Tons	Value
		\$
1923.....	200	1,400
1924.....	584	4,088
1925-29.....		
1930.....	273	1,356
1931.....	117	2,893
1932.....		
1933.....		

NOTE.—For years 1886 to 1922 see previous reports.

Table 150.—World Production of Manganese Ore, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
Gold Coast (exports).....	247,191	50,689	265,140	Manchoukuo.....	640	59	740
Northern Rhodesia.....	1,467		5,367	Portugal.....	266		25
Union of South Africa.....	100,290		20,894	U.S.S.R. (Russia).....	862,000	813,000	982,000
Canada.....	104			Spain.....	17,633	2,550	2,789
India.....	537,844	212,604	218,307	Sweden.....	8,232	4,653	6,124
Unfederated Malay States..	8,848	9,278	13,194	Egypt.....	100,174	322	184
Australia.....	13	106	129	Morocco (French zone)...	10,659	4,000	4,752
Total.....	900,000	270,000	520,000	Cuba.....	6,491	2,113	89,224
FOREIGN COUNTRIES				Puerto Rico (exports)...	2,374	2,302	1,638
Austria (b).....	11,298	6,480	5,377	Mexico.....	719	301	(a)
Czechoslovakia.....	82,558	32,951	16,799	United States (c).....	39,242	17,777	18,558
France.....	325		(a)	Argentina.....	218	248	404
Germany.....		12	(a)	Brazil.....	142,731	20,555	24,500
Greece.....	301	733	(a)	Chile.....	377	441	450
Hungary.....	1,114	1,473	6,134	China.....	30,700	21,200	9,300
Italy.....	6,320	372	4,453	Japan.....	12,646	25,828	42,847
Yugoslavia.....	2,415	156	521	Netherlands, East Indies..	14,311	8,156	10,298
Roumania.....	18,490	4,971	2,337	Turkey.....	1,000	2,800	7,600
				Total.....	1,360,000	970,000	1,230,000
				World's Total.....	2,260,000	1,240,000	1,750,000

(a) Information not available.

(b) Manganese content of manganese ore and manganiferous iron ore.

(c) Shipments, excluding ore containing 10 to under 35 per cent mn, which is included with iron ore, as follows:—

1931.....	64,062 long tons.
1932.....	15,635 "
1933.....	12,779 "

MERCURY

There has been no Canadian production of new mercury reported since 1897. Previous to this a small output of quicksilver was recorded as having been produced in British Columbia from a property situated on the north shore of Kamloops Lake. The principal mercury producing countries are Italy, Spain, United States, Mexico and Czechoslovakia.

The Bureau of Mines, Washington, D.C., reports that in the United States in 1928 drugs and chemicals accounted for about 39 per cent of the mercury consumed and fulminate used in detonators and ammunition for 19 per cent. Next in importance was the use of mercury for scientific instruments and electrical apparatus, followed in turn by vermilion, felt, and caustic soda and glacial acetic acid. This order of importance probably has remained substantially the same since 1928, if the large amount of mercury used in 1932 for mercury boiler plants is not considered, although the proportionate use for electrical apparatus may have increased somewhat. It is stated that there is virtually no loss of mercury in these mercury-boiler installations and thus they do not constitute a source of continuing demand. Some time in the future electric generating plants probably will be installed which will require important amounts of mercury. Gradual increase in the requirements of the electrical industry may be anticipated. In Canada a considerable amount of mercury is utilized in the amalgamating of gold in ores.

Imports of mercury into Canada in 1933 totalled 49,066 pounds valued at \$35,057 compared with 43,230 pounds at \$37,068 in 1932. The value of mercury salts imported in 1933 amounted to \$1,676 as against a value of \$3,716 in the previous year.

Quicksilver was quoted in the United States in September, 1934, per flask of 76 pounds, \$74.50 to \$75.50. London, £11 10s.

Table 151.—Production of Mercury in Canada, 1895-1933

Year	Flasks	Price per flask	Value
1895.....	71	\$ 33-00	\$ 2,348
1896.....	58	33-44	1,940
1897.....	9	36-00	324
1898-1933.....			

Table 152.—Imports into Canada of Mercury, 1926-1933

Year	Pounds	Value
1926.....	100,492	\$ 84,910
1927.....	124,099	160,330
1928.....	199,603	269,746
1929.....	346,701	478,048
1930.....	105,755	153,837
1931.....	21,159	25,454
1932.....	43,230	37,068
1933.....	49,066	35,057

Table 153.—World Production of Mercury, 1931-1933

(Supplied by *Imperial Institute*)

(Pounds)

Country	1931	1932	1933
BRITISH EMPIRE			
Australia.....	817	1,989	46
New Zealand.....	34,200	1,500	7,500
FOREIGN COUNTRIES			
Austria.....	998	2,200	440
Czechoslovakia.....	168,927	99,329	14,872
Italy.....	2,861,679	2,240,518	1,348,306
Spain.....	1,503,843	1,797,978	1,491,001
Algeria.....	82,000	90,041	(a)
Mexico.....	554,183	557,176	340,372
United States.....	1,895,972	959,272	714,552
Chile.....	(a)		
Turkey.....	17,925		1,748
Japan.....	7,725	5,256	17,807
China.....	49,000	44,000	33,000
Korea.....	3,085	2,050	(a)
Roumania.....	551	168	600
Bolivia (exports).....	77,645	38,380	(a)
Peru (exports).....	157		
World's Total.....	(b)7,300,000	5,800,000	(a)

(a) Information not available.

(b) Excluding U.S.S.R. (Russia).

MOLYBDENUM

No molybdenite ores or concentrates were produced in Canada in 1933. The mineral occurs in Nova Scotia, Quebec, Ontario, Manitoba and British Columbia and deposits in Ontario and Quebec have yielded commercial outputs during past years. New plant construction was reported in 1933 at the Chisholm molybdenite mine, Addington county, Ontario.

The Climax Molybdenum Company at Climax, Lake county, Colorado, The Molybdenum Corporation of America at Questa, New Mexico, U.S.A., and the Knaben Molybdenite mines in Fjotland, Southern Norway, produce approximately 97 to 98 per cent of the world's molybdenum.

According to the Bureau of Mines, Washington, D.C., the use of molybdenum in cast iron is growing. Such iron is used for brake drums on automobiles. Steels containing 0.15 to 0.25 per cent of molybdenum and 0.50 to 1.10 per cent of chromium, with or without 0.40 to 0.70 per cent of manganese, are used extensively in automobiles. Molybdenum sheet has been employed for plate in radio and Roentgen tubes; the wire is used as a support in radio tubes and incandescent lamps, and wire and ribbon are used as heating elements in small furnaces. Ammonia molybdate is used in large quantity to determine phosphorous in ores, iron, and steel. Numerous patents cover the use of molybdenum for corrosion-resistant alloys, tool steel, electrical equipment, armour plate and various other purposes.

It has recently been reported that the ores of the Green Cananea Copper Company's property in Mexico contain molybdenum. This is being recovered as a high grade molybdenum sulphide concentrate for which there is said to be a ready market.

Mine production of molybdenum ore in the United States in 1933 amounted to 705,000 short tons which yielded 5,348 short tons of concentrate carrying 5,627,700 pounds of metallic molybdenum. In 1932 the production was 363,400 tons of ore equivalent to 2,431,000 pounds of metallic molybdenum. In 1933, as in other recent years, the Climax Molybdenum Company

and the Molybdenum Corporation were the principal producers and shippers. Output of molybdenum ores at the Knaben mine in Norway during 1932 totalled 329 tons with 80 per cent MoS_2 ; 1933 figures not available for this property. The mill on this property was destroyed by fire in February, 1933.

"Metal and Mineral Markets" quote molybdenum ore prices in September, 1934, as follows: per pound of contained MoS_2 , nominally 42 cents for 75 to 85 per cent concentrate. London, per long ton unit, nominal at 35s. for 80 to 85 per cent concentrate.

Imports of calcium molybdate when imported by Canadian manufacturers of steel for use exclusively in the manufacture of steel in their own factories totalled 7,082 pounds valued at \$3,414 in 1933 compared with 14,219 pounds at \$5,365 in 1932.

Table 154.—Production of Molybdenite in Canada, 1924-1933

Year	Ores mined	Ores treated	Ores and concentrates shipped		MoS_2 content of shipments	MoS_2 production (probable recovery)	
	Tons	Tons	Tons	Value (a) \$	Pounds	Pounds	Value (b) \$
1924.....	700	668	10.0	9,370	18,739	18,739	9,307
1925.....	3,000	2,779	15.3	11,176	22,350	22,350	11,176
1926.....	4,186	4,490	12.6	10,472	20,943	20,943	10,472
1927.....							
1928.....							
1929.....	9,100	2,900	9.5	6,400	16,150	16,150	6,400
1930.....							
1931.....	12	12	0.61	280	1,222	1,222	280
1932.....							
1933.....							

(a) Value as given by the operators. (b) Estimated at the average market value of molybdenite.

NOTE.—For years 1902 to 1923 see previous reports.

Table 155.—World Production of Molybdenum Ore, 1931-1933

(Supplied by *Imperial Institute*)

(In cwt.—112 pounds of concentrates)

Country	1931	1932	1933
BRITISH EMPIRE			
Canada (MoS_2).....	11		
Australia.....	11	102	130
FOREIGN COUNTRIES			
Norway (MoS_2 content).....	3,380	5,181	8,149
French Morocco (ore).....			2,362
United States (MoS_2 content).....	46,616	36,176	84,554
Korea.....	433	879	2,070
Peru.....		130	127
Mexico.....	112	103	1,303

RADIUM-URANIUM (Pitchblende-Silver)

Considerable exploratory and development work was conducted during 1933 on the pitchblende-silver deposits of the Great Bear Lake area in the Northwest Territories. Eldorado Gold Mines, Ltd., stated in their annual report that drifting on No. 2 vein disclosed an ore shoot 200 feet long and 4 feet wide with a content of thirty ounces of silver to the ton and important quantities of pitchblende in the form of lenses and finely disseminated values. A concentrating mill, with a crushing and grinding capacity of at least 75 tons per 24 hours and a concentrating capacity of 25 tons, was erected at the property and the milling of ore commenced. The Port Hope, Ontario, extraction plant of the company operated satisfactorily during 1933 and modifications have been made to the process that have greatly increased its efficiency. A total of 58 tons of pitchblende was treated during the year and radium and uranium salts produced. The plant was designed to treat from 3 to 4 tons of pitchblende a week. The Consolidated Mining and Smelting Company of Canada, Ltd., operating in the same area, reported that in the course of development, shipments of high grade ore were made which gave satisfactory returns; indica-

tions were reported to have been so favourable that plans were made for the installation of further equipment in 1934. Other properties under development in this district in 1933 included those of Bear Exploration and Radium, Ltd., White Eagle Silver Mines, Ltd., and North West Minerals, Ltd.

In Ontario, Canada Radium Mines, Ltd., continued development work on its property at Cheddar, south of Wilberforce.

The Union Minière du Haut Katanga, operating in the Belgian Congo, is the largest producer of radium in the world. This company reported that the demand for radium was greater in 1933 than for the previous year and could be met easily.

It was stated early in the year that the Czecho-Slovakian State factory in Joachimsthal had decided to limit its radium output owing to accumulation of stocks; manufacture of uranium pigments may not be diminished.

The world's stocks of radium are estimated by Prof. Dr. Krusch of Berlin to have been about 700 grams in 1932. He estimates also that half of this quantity is held in the United States. Radium prices, states the Mining Journal, London, are reported to be, in part, a matter of bargaining, but the Union Minière prices in 1930 ranged from about £10,000 to £14,700 per gram, depending on the quantity purchased. Since 1930 the prices have been fairly stable. The Journal comments that the great value of radium and mesothorium in the treatment of suffering humanity suggests the desirability of producing these substances in far greater quantities than hitherto.

Uranium, in the form of salts, is utilized principally as a colouring medium in the ceramic and glass industries. Uranium oxide, in kegs, was quoted from \$1.50 per pound, New York, September, 1934.

Imports of radium into Canada during 1933 amounted in value to \$8,374 compared with a value of \$45,107 in 1932. No radium exports were reported.

Table 156.—World Production of Uranium Minerals, 1931-1933

(Supplied by Imperial Institute)
(Cwt. 112 pounds)

Country	1931	1932	1933
BRITISH EMPIRE			
Canada.....		(b)	(b)
FOREIGN COUNTRIES			
Czechoslovakia (U ₃ O ₈).....	309	376	236
Portugal.....		645	1,233
Madagascar.....			(a)
United States (U ₃ O ₈).....	11	34	18
Belgian Congo.....	8,149	(i)	(i)

Uranium minerals are also produced in Russia. The production recorded in 1927 was about 50 tons; later information is not available.

(a) Information not available.

(b) 58 tons of pitchblende were treated in Canada in 1933 and produced 3,021 mgrms. of radium of 98 per cent average concentration and 34,940 pounds of uranium salts.

(i) The output of uranium minerals is not available for these years but it is reported that the radium produced from these ores amounted to 40; 6; and 6.7 grams in 1931, 1932 and 1933 respectively. This production of radium represents the greater part of the world's supplies.

SELENIUM

Production of selenium in Canada during 1933 totalled 48,221 pounds valued at \$70,345. This output was obtained as a by-product in the electrolytic refining of copper in the provinces of Quebec and Ontario. The metal was recovered for the first time in Canada early in 1931 at the plant of the Ontario Refining Co., Ltd., Copper Cliff, Ontario. The present output in Quebec comes from the Montreal East plant of the Canadian Copper Refiners, Limited.

The Department of Mines, Ottawa, reports that the chief use of selenium at present is in the glass and pottery industries, both as a colouring agent and to neutralize objectionable oxides; the most important development is probably the photo-electric cell or electric eye which is finding many industrial applications. Selenium cells also play an important part in television; it is being used in stainless steel for developing improved cutting and threading qualities; a large potential market, at present inactive, exists in certain rubber-compounding industries.

Canada is now in a position to produce selenium in considerable quantity, however, the output is at present restricted to a narrow market.

Selenium was quoted in United States in September, 1934, at \$1.80 to \$2.00 per pound, depending on quantity, for black, powdered, 99.5 per cent pure.

TANTALUM AND COLUMBIUM

Tantalum is considered a rare element, the principal ore of tantalum, tantalite, has been produced principally in western and northern Australia. This mineral together with columbite also occurs in Renfrew county, Ontario. Tantalum in 1933 was quoted at \$91 per kilo for C.P. bar or sheet.

The Pilbarra field of western Australia is the chief source of the metal.

The United States Department of Mines reports that important progress was made in 1933, commercially as well as technically in the employment of tantalum carbide, alone and with other carbides, in ultrahard cutting-tool materials. Continued headway was made in 1933 in the introduction of commercially pure metal (99.9 per cent) in the electrical and chemical industries. Tantalum is now available in a wide range of shapes and sizes.

Columbium has properties remarkably similar to those of its twin metal tantalum, except for its lower melting point. In the past there has been no demand for columbite high in columbium, but with such demand impending, new developments in British Africa are counted upon as the supply of by-product columbium from fields prospected for tantalum is deemed inadequate and unduly costly.

TELLURIUM

Tellurium is contained in the anode slime produced in the electrolytic copper refineries located at Copper Cliff, Ontario, and Montreal East, Quebec. These plants, until the close of 1933, had not reported the recovery of the metal, however, the Canadian Copper Refiners Limited, Montreal East, have announced that they expect to produce and market tellurium in the near future.

It is reported in "Metal and Mineral Markets" that tellurium-lead is now being manufactured in the United States and is obtainable in pipe or sheet form. The addition of less than 0.1 per cent of tellurium to lead increases the tensile strength of the metal. Greater resistance to corrosion by acids and better working qualities are claimed for the product. It has also been reported that electro-platers are using a solution of tellurium chloride as a dip for silverware when a dark finish is desired.

Tellurium was quoted in the United States in September, 1934, at \$2.00 per pound.

TIN

Tin ores are not mined in Canada. The metal is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in southeastern Manitoba. It is also found at New Ross, Nova Scotia.

The world's production of tin in 1932 totalled 99,000 long tons compared with 147,000 long tons in 1931, according to the Imperial Institute, London. The principal tin producing countries are Federated Malay States, Bolivia, Netherlands, East Indies, Siam, China and Nigeria. The International Tin Research and Development Council, The Hague, reports the world's tin consumption in 1933 at 127,755 long tons compared with 99,986 long tons in 1932; consumption in Canada is given at 1,417 long tons in 1933. It is interesting to note that a process recently described makes it possible for any plater or manufacturing group to take up electro-tinning with a bath which permits the formation of deposits of almost any thickness. Assistance is being given by the Council to several important organizations in the electro-plating, chemical and engineering industries in the development of the process on an industrial scale. A promising new use for tin seems likely to have been established as a result of investigations carried out to produce a satisfactory tin accumulator.

The average 1933 price for standard tin, London, is given at £194.5 (sterling) per long ton; New York, 39.1 cents (currency) per pound (Straits). The New York price, June, 1934, is reported by the I.T.S. and D. Council, The Hague, at 51.2 cents (currency) per pound, London, £227.0 (sterling) per long ton.

Table 157.—Available Statistics on the Consumption of Tin in Specified Canadian Manufacturing Industries, 1931-1933

Industries	Items (used)	1931	1932	1933
		Pounds	Pounds	Pounds
Brass and copper products.....	Tin castings.....	66,000	66,000	.....
Brass and copper products.....	Tin ingots and bars.....	161,000	117,000	126,000
Brass and copper products.....	Tin plates, slabs and sheets.....	35,000	33,000	37,000
Brass and copper products.....	Tin scrap.....	30,000	31,000	4,000
White metal alloys.....	Pig tin.....	2,360,000	2,247,000	2,086,000
Iron and steel.....	Tin.....	2,058,000	1,105,000	631,000
Grand Total.....		4,710,000	3,599,000	2,884,000

Table 158.—Imports into Canada of Tin, 1931-1933

	1931		1932		1933	
	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
Tin in blocks, pigs and bars.....	4,125,800	1,067,395	3,148,400	809,437	2,834,100	1,149,378
Tin foil.....	27,167	12,095	6,749	3,293	8,271	4,076
Strip waste.....	304,000	1,615	1,884,000	6,850	3,416,000	11,310
Collapsible tubes.....		62,889		67,810		81,258
Tin plated kitchen and dairy hollow-ware not painted or decorated.....		65,552		72,445		39,355
Manufactures of tin plate, painted, japanned, decorated or not, and manufactures of tin, n.o.p.....		983,897		723,511		437,982
Tin cans and containers for food.....		80,493		126,418		138,297
Containers manufactured from tin plate, n.o.p.*						165,509
Bichloride of tin or tin crystals.....	945,832	177,166	1,185,483	189,128	826,632	149,880
Total.....		2,451,102		1,998,892		2,011,536

* From April 1, 1933.

Table 159.—World Smelter Production of Tin, 1931-1933

(Supplied by Imperial Institute)
(Long tons)

Country	1931	1932	1933
BRITISH EMPIRE			
United Kingdom (estimated).....	35,600	28,500	18,200
British Malaya (b).....	87,514	49,945	46,942
Australia.....	1,690	1,958	2,360
Total.....	125,000	80,000	68,000
FOREIGN COUNTRIES			
Belgium (estimated).....	200	800	2,700
France.....	713	185	600
Germany.....	3,689	1,871	(a)
Italy.....	8	7	7
Netherlands (estimated).....	3,000	3,500	5,000
Portugal.....	61	74	84
China.....	5,891	7,890	7,600
French Indo-China.....	67		
Japan.....	999	987	950
Netherlands East Indies (exports).....	12,788	8,091	8,792
Norway.....	196	242	160
Mexico.....	12	(a)	(a)
Total.....	28,000	24,000	28,000
World's Total.....	153,000	104,000	96,000

Secondary tin recovered in the United States (as metal, in alloys, and in chemical compounds), was as follows:—

1931.....	17,679 long tons
1932.....	13,170 "
1933.....	19,732 "

(a) Information not available.

(b) Exports plus difference between "carry-over" at end and beginning of the year

TITANIUM

The minerals rutile and ilmenite constitute the chief ores of titanium. Important deposits of ilmenite containing rutile occur near Baie St. Paul, Quebec, and titaniferous ores have been exported from this area for some years. There was, however, no production of titanium ores in Canada during either 1933 or 1932. Production from the Baie St. Paul deposits recommenced in the first half of 1934 when 2,023 tons of titanium ore valued at \$14,171 were reported as being shipped.

According to the Technical Press the Titanium Pigment Company of New York is to erect a new eastern manufacturing plant in New Jersey at a cost of \$3,000,000. This plant will supplement the plants operated by this Company at St. Louis and Niagara Falls, New York, and will more than double the company's present production of "Titanox" pigments. It has also been reported that the Japanese Government has granted a subsidy in order to establish a domestic titanium white industry.

Titanium pigments are chiefly used for paint making, sometimes in conjunction with other pigments and are usually employed combined with precipitated barium sulphate. A new plant for the manufacture of titanium pigments was inaugurated in May, 1933, at Luton, England. The barium sulphate used in the Luton plant is produced from British barytes.

One of the largest factories for titanium compounds in Europe is that of the Bovisa works at Milan, Italy. This plant has a production capacity of about 2,000 short tons per year of which two-thirds are exported to other European countries. The pigment is manufactured from ilmenite which has a maximum titanium oxide content of between 40 and 50 per cent.

It is reported in the "Chemical Trade Journal," London, that the Russian Soviet is displaying increased interest in the exploitation of rare elements and titanium ores are being given special attention.

In the last year or two titanium has come into prominent notice in the solution of problems involved in the manufacture and use of the rustless steels. So large has come to be the demand for titanium in this branch of the steel industry that several companies are now producing alloys of titanium to introduce the metal into rustless steels and also into other steel products and cast iron. (Iron Age.)

The greater part of the world's titanium supply comes from ilmenite deposits located in British India, Norway and Senegal. Rutile is also produced in Norway. "Mineral Industry" reports that there are numerous localities capable of being developed for the production of ilmenite ore and that an extensive deposit of ferrotitanium ore in the Arabian desert in Egypt has been recently reported and surveyed.

Ilmenite production in British India in 1932 totalled 50,053 long tons as compared with 36,166 tons in 1931; Norwegian output in 1932 amounted to 13,268 tons as against 5,000 in 1931. Titanium minerals are also produced in the United States but figures are not available for publication.

CONSUMPTION OF TITANIUM WHITE IN CANADIAN PAINT INDUSTRY, 1931-1933

	Pounds	Cost at works
1931.....	745,207	\$ 89,761
1932.....	691,304	96,759
1933.....	1,061,249	128,969

Titanium ore prices as quoted by "Metal and Mineral Markets," September, 1934, were: per gross ton ilmenite, 45 to 52 per cent TiO_2 , f.o.b. Atlantic seaboard, \$10 to \$12, according to grade and impurities. Low-grade domestic, 32 to 35 per cent, about \$7 to \$8. Rutile, per pound guaranteed minimum 94 per cent concentrate, 10 cents. Titanium, per pound, 96 to 98 per cent, \$6 to \$7. Ferrocantitanium, per ton, \$137.50 f.o.b. producer's plant, car lots. Titanium dioxide: per pound car loads, in paper bags, 17 cents; in barrels, $17\frac{1}{4}$ cents. Canadian Chemistry and Metallurgy quotes pure titanium oxide price in barrels (100 pounds)—\$21.85. June, 1934.

TUNGSTEN

Tungsten minerals have been found in widely separated districts in the Dominion. Deposits in Nova Scotia and New Brunswick appear to possess the greatest economic possibilities. Comparatively small shipments of tungsten ores were made in Canada in 1912 and 1917; since then no production has been reported in Canada. Underground work was commenced in October, 1933, at the Indian Path tungsten mine located in Lunenburg county, Nova Scotia; the company reported that it was the intention to crosscut from the 75 foot level to open up ore bodies disclosed by diamond drilling in 1931.

Tungsten is employed in the manufacture of alloy steels, electric light filaments, tools and many other metal products. The principal tungsten producing countries are India (Burma) and China.

"Metal and Mineral Markets," August, 1934, contains the information that Chinese tungsten ore is being controlled by the Chinese Monopoly Bureau with scant regard for law of supply and demand. The Bureau, with headquarters at Canton, was established towards the close of 1933 by the South-West government. Exports during the first half of 1934 amounted to about 3,000 tons against 1,500 tons in the same period of last year. Of the total so far shipped in 1934—1,900 tons went to European optional ports and Hamburg (partly destined for Russia), between 600 and 700 tons to the United States and 400 tons to France.

It was reported in the Technical Press, England, that the demand for tungsten ores revived during 1933 owing to expansion in the iron and steel industry and the demand coming on the industry in a very depressed condition caused a rapid advance in price at the beginning of the second half of the year. The discovery of a deposit of tungsten ore between Kene, Egypt, and the Red Sea, has been announced, the ore is stated to contain from 50-70 per cent of wolframite.

One of the more outstanding and recent features of the tungsten industry is the increase in consumption of tungsten carbide as a substitute for diamonds in drills, drawing dies and cutting tools.

Imports of chromium metal and tungsten metal in lumps, powder, ingots, blocks or bars, etc., amounted to 17,755 pounds valued at \$8,801 in 1933 compared with 15,800 pounds at \$7,967 in 1932. Imports of metallic elements and tungstic acid for use only in the manufacture of metal filaments for electric lamps amounted in value to \$46,734 in 1933 as against \$59,109 in 1932.

Tungsten ore prices as reported by "Metal and Mineral Markets" in September, 1934, were: per unit of WO_3 , N.Y.: Chinese Wolframite, \$16.50 to \$17, duty paid. Bolivian scheelite, nominal. Domestic scheelite, \$16.50 to \$17.

Table 160.—World Production of Tungsten Ore and Concentrates, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom—				Portugal—			
Concentrates.....	100	2	11	Concentrates.....	257	257	298
Southern Rhodesia—				Spain—			
Concentrates.....	21	13	30	Concentrates.....	129	39	41
Union of South Africa—				United States—			
Concentrates.....	2			Concentrates.....	1,254	354	799
India—				Argentina—			
Concentrates.....	2,248	2,023	2,147	Concentrates.....	19	6	(a)
Federated Malay States—				Bolivia—			
Wolfram.....			33	Concentrates.....	402	671	230
Scheelite.....	368	302	918	China—			
Unfederated Malay States—				Ore.....	6,476	2,146	5,400
Wolfram.....	193	129	79	French Indo-China—			
Australia—				Tin-tungsten concentrate	231	218	229
Wolfram.....	80	44	128	Japan—			
Scheelite.....	4	(12 cwt.)		Scheelite.....	51	20	29
FOREIGN COUNTRIES				Korea—			
Czechoslovakia—				Ore.....	15	56	150
Concentrates.....	12			Netherlands East Indies—			
Tin-tungsten concentrates	10			Ore.....	1		
				Siam (exports)—			
				Ore.....	10		

(a) Information not available.

VANADIUM

No vanadium ores are produced in Canada. Relatively small quantities of the metal are known to occur in association with magnetite deposits located in the Rainy River district of Ontario. Vanadium production during recent years has been practically restricted to the ores from Minasragra, Peru; the oxidized metallic minerals from Broken Hill, Northern Rhodesia, and from the vicinity of Otavi, South West Africa, and the roscoelite and related minerals of Western Colorado and Southwestern Utah, U.S.A. The vanadium operations at Otavi were discontinued in September, 1932. Considerable work has been done on the recovery of vanadium in Russia, none of the ores are of sufficient richness to use direct and the metal is recovered as a by-product.

The principal consumption of the metal is in the manufacture of special, tough steels and its salts are utilized in the chemical and other industries. A catalyst composed of vanadium pentoxide is reported to possess high efficiency.

In high-speed steels there is apparently a tendency to increase the vanadium content. In adding vanadium to steel the practice is usually to introduce it in the form of ferro-vanadium, some steel makers, however, add vanadium oxide to the molten slag from which it is absorbed into the steel.

September, 1934, the quotation for vanadium ore in the United States was 26 cents per pound, V_2O_5 content, f.o.b. shipping point.

Table 161.—World Production of Vanadium Ores, 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933
BRITISH EMPIRE			
Northern Rhodesia—Oxide.....	268	363	70
Concentrates.....	705	1,204	.....
South West Africa.....	4,602	2,973	177
FOREIGN COUNTRIES			
France.....	84	53	(a)
United States (V_2O_5).....	(a)	103	3

() Information not available.

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

An increase in the development of Canadian deposits containing the non-ferrous metals has stimulated an expansion in the domestic smelting and refining of these metals. Abundant water power, conveniently located in regard to the mining districts, has made possible the generation of electric energy at such low cost that the utilization of electrochemical or electrothermic processes has been adopted for many metallurgical purposes. Some of the more important of these applications include the electrolysis of alumina and the production of aluminium in various forms in Quebec, the production of electrolytic copper at Montreal East; the refining of nickel and copper in central Ontario and the manufacture of refined zinc in Manitoba and British Columbia. Electrolytic lead is produced at Trail, British Columbia, by the Consolidated Mining and Smelting Company. Electric furnaces are also used throughout the world in the production of abrasives, ferro-alloys, titanium products, magnesium, beryllium, iron, ferro-silicon, carbides and cyanamide.

As a source of power, electric energy is being used to an ever increasing extent in mining and milling operations where important economies in operation are being effected.

In the extraction and treatment of ores, the mining and milling are so closely associated that it is impossible to make a separation of the statistics of these two operations. There is less difficulty in drawing a line between mining and milling on the one hand, and smelting and refining on the other, though there are cases where mining, milling and smelting operations are so closely related that it is very difficult to separate the figures on capital employed. This chapter is devoted to a consideration of the smelting and refining industry in Canada as it applies to the ores of the non-ferrous metals.

A distinct upward trend was experienced during 1933 in the non-ferrous smelting and refining industry of Canada. The cost of ores, concentrates, etc., treated was estimated at \$43,242,563, an increase of 14.6 per cent over 1932; the value of plant products totalled \$100,561,297 compared with \$76,442,076 for the preceding year, an increase of 31.6 per cent, and the value added in Canadian plants by metallurgical treatment in 1933 revealed an increase of 48 per cent compared with 1932. This pronounced improvement in what might be described as almost a key industry, together with an increase in the value of exports of the non-ferrous metals from \$48,130,177 in 1932 to \$69,340,625 in 1933, would not only indicate a broad and increasing demand in the metal consuming industries but would emphasize the growing prestige of Canadian mine products in the metal markets of the world.

Quebec.—The primary aluminium industry of Canada is centred at Shawinigan Falls and Arvida, Quebec. In 1933 the reduction plant of the Aluminum Company of Canada at Shawinigan Falls was active until August 31, at which time the works were closed down; the fabricating plant, however, was in continuous operation throughout the year. At Arvida only the reduction plant was running, the slag ore unit being inactive during the entire year. Aluminium ingot was produced in both reduction plants. Alumina recovered from foreign ores is utilized in the production of aluminium metal in Canada. When operating at full capacity the aluminium industry is a large consumer of electrical energy as the metal is reduced in electric furnaces.

At Rouyn during 1933 the Noranda Copper smelter was operated continuously and treated 1,010,629 tons of ore, concentrate and refinery slag, and produced 65,337,559 pounds of anodes, the average analysis of which was 99.36 per cent copper, 8.70 ounces gold per ton and 15.61 ounces silver per ton.

The following table shows the amount of material treated in the Noranda smelter and the production each year since commencement of operations:—

Year	Tons of ore, concentrate and refinery slag smelted	Pounds of fine copper	Gold produced	Silver produced
			Ounces	Ounces
1927.....	10,740	552,345	767	2,644
1928.....	271,926	33,065,261	52,949	186,277
1929.....	428,221	51,223,115	68,732	334,279
1930.....	734,072	75,509,373	117,393	691,920
1931.....	765,544	62,859,355	253,363	558,801
1932.....	918,567	63,013,485	341,350	619,597
1933.....	1,010,629	65,008,731	284,675	510,739

The Montreal East plant of Noranda's subsidiary, Canadian Copper Refiners, Ltd., was in production during the twelve months of 1933; electrolytic copper was produced in the form of wire bars, ingot bars, small ingots and cathodes. In addition to the refined copper output the company recovered gold, silver, and a selenium product. An addition to the refinery for the purpose of the commercial production of both selenium and tellurium was commenced. This company, in addition to refining blister copper received from Flin Flon and Noranda, treats considerable quantities of scrap metal.

Ontario.—The International Nickel Co. of Canada, Ltd., reports that the Copper Cliff smelter, Copper Cliff, Ontario, produced 53,186 tons of bessemer matte and 61,385 tons of blister copper. Two reverberatory furnaces were operated on mill concentrates until the end of June and three for the balance of the year. One blast furnace was used continuously for the Orford process. This was the first full year of operation for the new Orford process plant and the results were so satisfactory from the standpoint of costs and quality that the wisdom of moving from Port Colborne to Copper Cliff has been proved. The Coniston smelter resumed operations in June with two blast furnaces and two converters and treated 328,640 tons of ore and produced 20,645 tons of bessemer matte. The nickel refinery of the company located at Port Colborne, Ontario, produced 41,496,664 pounds of nickel in the form of electrolytic cathodes and nickel in oxide. Operations were resumed in May when three electrolytic circuits were started, followed by two additional circuits in June and a sixth in August. All six circuits remained in operation during the remainder of the year. The principle of spreading labour at Port Colborne continued and the management was able to provide work for all former married employees, and new employees were restricted to married men with families. The Clydach refinery of the Mond Company located in Wales produced 20,760,117 pounds of nickel compared with 7,416,464 pounds in 1932, an increase of 180 per cent. Except for a short period when the works were closed due to flood damage the refinery ran continuously. At the Acton refinery (London) of the same company, progress was made in the metallurgy of the platinum metals and the increased scale of operations at Port Colborne and Clydach resulted in an increase in the quantity of platinum metals to be processed.

The Ontario Refining Company, Ltd. (67·79 per cent owned by the International Nickel Company of Canada, Ltd.) governed operations in 1933 at its electrolytic copper refinery, Copper Cliff, Ontario, entirely by the tonnage of blister copper received from the Copper Cliff smelter as no outside copper was refined. The operations were increased from 4,000 tons of blister copper per month at the beginning of the year to 6,500 tons per month during the last quarter. The total output for 1933 was 58,098 tons of refined copper and the substantial increase in production resulted in lower refining costs.

The smelter of the Falconbridge Nickel Mines, Ltd., situated at Falconbridge, in the Sudbury area, operated with normal minor interruptions throughout 1933 with the exception of a two weeks shutdown in April at the time of starting up the new concentrating and sintering plants. Results of operations tabulate as follows:—

Total ore treated.....	232,661 short tons
Matte produced.....	8,297 short tons
Nickel produced in matte.....	4,671·5 short tons
Copper produced in matte.....	2,103·5 short tons

The company reports that while changes have resulted in slightly increased smelting losses, much lower grades of ore than before can be treated with advantage so the net result is a very complete utilization of the mine. The Norwegian refinery of the company operated satisfactorily without any closedown during the year, although until arrival of the increased smelter production in May, it occasionally suffered from shortage of matte. This plant received 8,281 short tons of Falconbridge matte in 1933 and produced 7,468,320 pounds of nickel and 3,282,113 pound of copper in marketable form.

The Deloro Smelting and Refining Co., Ltd., with metallurgical works located at Deloro, Hastings county, Ontario, and specializing in the treatment of cobalt-silver-arsenic ores, reports continuous operations in 1933. The smelting and refining units of this plant operated on ores mined in Northern Ontario. Shipments comprised silver bullion, white arsenic, cobalt oxide, cobalt metal, cobalt salts, mixed oxides, nickel oxides, and silver-lead-bismuth bullion. Silver and arsenic were first produced in this plant in 1907 while black and grey cobalt oxides were first marketed by the company in 1911; mixed nickel and cobalt oxides were first made at Deloro in 1910.

The radium extraction plant of Eldorado Gold Mines, Ltd., located at Port Hope, Ontario, operated satisfactorily throughout 1933 and modifications have been made to the process that have greatly increased its efficiency. A total of 58 tons of pitchblende from Great Bear Lake, Northwest Territories, was treated during the year and the annual report of the company states that 3,021 mgm. of radium in finished form at 98 per cent average concentration and 34,940 pounds of uranium salts were produced. The plant was designed to treat from 3 to 4 tons of pitchblende a week.

Manitoba.*—The copper smelter of the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, was operated continuously during 1933 almost entirely upon concentrates produced by the company itself, as only 610 tons of customs ore and concentrates were treated during the year. Due to the necessity of exceedingly fine grinding in the concentrator, the copper concentrates always run quite high in moisture, therefore considerable amounts of coal have to be used in the roasters to keep them operating successfully. As electric power was available, treating units were installed to heat the air delivered to the roasters and this installation, while only operating for about a month in 1933, gives promise of a material saving in roaster operating costs.

There were smelted in the reverberatory furnace during the year 246,783 tons of Flin Flon ore and concentrates averaging: Au.-oz. .331; Ag.-oz. 4.53; Cu. % 9.02, and in addition 610 tons of miscellaneous customs' ores and concentrates yielding gold, 156.42 oz.; silver, 86.7 oz., and copper, 13,992 pounds. From the Flin Flon concentrates and other products there was produced and shipped blister copper containing 94,745.24 ounces gold; 1,222,895.2 ounces silver, and 41,148, 717 pounds of copper.

The electrolytic zinc plant of the company was in continuous operation in 1933; electrolytic zinc produced averaged 99.9894 per cent pure. A certain amount of die-casting zinc, averaging 99.99 per cent zinc was produced and had a ready market. The amount of zinc lost as residue per unit of zinc in the concentrates decreased 12.3 per cent and the tankhouse current efficiency was increased 3.4 per cent. There were treated by the zinc plant during the year 66,869 tons of zinc concentrates averaging gold .09 oz.; silver, 1.95 oz.; copper, 1.15 per cent; and zinc, 45.1 per cent, from which were produced 46,305,736 pounds of zinc. In addition there were produced, as a necessary part of the operation of the zinc plant, zinc plant residue and so-called cadmium precipitate; these were stored for future treatment.

The hydro-electric power plant of the company at Island Falls generated a total of 197,823,900 kilowatt hours; the load factor at the plant continued to improve and averaged 91.0 per cent for the year 1933. The maximum temperature at the camp was 86° F., in the shade, and the minimum 50° below zero F., or a total difference between summer and winter of 137°.

British Columbia.—The Consolidated Mining and Smelting Co. of Canada, Ltd., states in its annual report that new low records were again established both per ton of ore smelted and per ton of lead produced in the lead smelting plant at Trail. The lead recoveries were down by three-quarters of one per cent due mainly to smelting Rossland ore in lead furnaces, as in-

*Part of the property of the Hudson Bay Mining and Smelting Company extends into the province of Saskatchewan.

sufficient of this ore was produced to run a copper furnace. It is interesting to note that in 1933 there was a slight increase in the silver content of the ore. Costs in the slag fuming plant were higher at the first of the year but much lower in the latter part, making a slight reduction for the whole year. The last three months were over 10 per cent lower than 1932. Record costs were made in the lead, silver and gold refineries. Toward the end of 1933 a change in the system was made which will result in making the Tadanac pig lead even higher in grade than formerly. In the early part of the year production in the zinc plant was cut to 45 per cent capacity and costs were adversely affected. During the last quarter production was slightly increased and costs were reduced, making the year's average cost the same as for 1932. The cadmium plant was run intermittently to suit the market. The company reports that custom ore business showed another decrease, due to low prices still prevailing, especially for silver. Shipments from gold producers are, however, increasing rapidly on account of the rise in the gold price.

Following is the metal production and tonnage treated at the Kimberley and Tadanac plants (together) from 1894 to date and for 1933:—

	1894 to date	1933
Ore treated.....tons	22,671,348	1,443,235
Gold produced.....ounces	2,309,232	22,393
Silver produced.....ounces	101,308,894	5,551,349
Lead produced.....pounds	3,477,011,359	254,639,548
Zinc produced.....pounds	1,755,055,417	137,619,895
Copper produced.....pounds	185,539,059	541,459
Cadmium produced.....pounds	2,357,057	246,041
Bismuth produced.....pounds	330,779	70,724

Sales of lead and zinc by Consolidated Mining and Smelting Co. of Canada, Ltd.:—

	1932	1933
Lead.....short tons	126,341	153,351
Zinc.....short tons	78,477	77,100

The British Columbia Department of Mines Annual Report states: "That during the first part of 1933 a strike at Anyox necessitated the suspension of operations for a short period by Granby Consolidated Mining, Smelting and Power Co. With very creditable energy and organization, operations were quickly resumed and have continued on a normal capacity basis, the mill treating about 5,000 tons of ore daily. At the close of 1933 employees in offices, mine, mill, smelter and coke plant numbered about 1,075 and the pay-roll was about \$125,000 per month. Production has been steadily maintained and with the improved copper price, stock blister copper shipments were facilitated. The net cost per pound of refined copper produced, after allowing credits for gold and silver values and miscellaneous income, but exclusive of depreciation and depletion, was 6.74 cents. At the present rate of extraction (1933) and unless new ore is found the recoverable ore reserves of the Anyox mines will be exhausted in about two years."

Tables 162.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment.....	107,238,667	101,508,625
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	10,370,049	12,446,854
(c) Inventory value of finished products on hand.....	17,925,108	16,768,493
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	14,175,036	15,361,312
Total	149,708,860	146,085,284

Table 163.—Principal Statistics, Including Ores, Concentrates and Residues Smelted and Value of Smelter and Refinery Products in the Non-Ferrous Smelting and Refining Industry, 1932 and 1933

	1932	1933
Number of companies.....	10	11
Number of plants.....	13	14
Number of salaried employees.....	739	679
Salaries..... \$	1,690,710	1,461,380
Number of wage-earners.....	4,604	5,681
Wages..... \$	7,088,260	6,941,801
Cost of fuel and electricity..... \$	7,070,746	7,809,936
Estimated cost of ores, concentrates, etc., treated..... \$	37,719,947	43,242,563
Value of plant products*..... \$	76,442,076	100,561,297
Value added by smelting..... \$	38,722,129	57,318,734

*Products include gold, silver, platinum metals, blister and anode copper, refined lead, zinc, copper and nickel, nickel-copper matte, nickel oxide, nickel salts, cobalt, cobalt oxide, aluminium, base bullion, cadmium, bismuth, arsenic and selenium.

Table 164.—Number of Wage-Earners by Months, in the Non-Ferrous Smelting and Refining Industry, 1932 and 1933

Month	1932	1933
January.....	5,496	5,003
February.....	5,400	4,831
March.....	5,355	4,926
April.....	4,750	4,890
May.....	4,297	4,910
June.....	4,475	5,534
July.....	4,205	6,080
August.....	4,160	6,322
September.....	4,198	6,368
October.....	4,326	6,478
November.....	4,316	6,396
December.....	4,274	6,410
Average.....	4,604	5,681

CHAPTER SEVEN

**THE COAL MINING, COKE, NATURAL GAS, PEAT AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA**

The Coal Mining Industry in Canada

1. General Review
2. Commodity Statistics on Coal—including Tables on Output, Disposition, Shipments, Imports into Canada and Exports, Consumption and World Output

The Coke and Gas Industry in Canada

The Peat Industry in Canada

The Petroleum Industry in Canada

1. Production of Crude Petroleum
2. Production of Petroleum Products

NOTE.—In order to correlate data, regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, peat and petroleum industries. This survey presents information in detail regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

THE COAL MINING INDUSTRY

The Canadian production of coal in 1933 amounted to 11,903,344 tons valued at \$35,923,962, an advance of 1.4 per cent in quantity but a decline of 3.2 per cent in value from the 1932 output of 11,738,913 tons with a valuation of \$37,117,695. Bituminous coal output during 1933 totalled 7,979,283 tons, a 3.4 per cent increase over the preceding year's production; on the other hand, sub-bituminous coal declined 1.2 per cent to 554,118 tons, and lignite coal 2.7 per cent to 3,369,943 tons. An advance of 11.6 per cent was recorded in Nova Scotia's production; the 1933 total was 4,557,590 tons and the previous year's, 4,084,581 tons. New Brunswick mines produced 312,303 tons as compared with 212,695 tons in 1932. Manitoba's output was higher at 3,880 tons. A 4.6 per cent increase was shown in Saskatchewan's production in 1933; the year's output was 927,649 tons as against 887,139 tons in 1932. Alberta mines reported a production of 4,718,788 tons, a decline of 3.1 per cent from the tonnage raised in 1932. British Columbia's coal output has been declining yearly since 1928 and in 1933 amounted to 1,382,272 tons or 17.8 per cent below the preceding year's total. In the Yukon, 862 tons of coal were mined as compared with 808 tons during 1932.

Exports of Canadian coal have shown a steady decline since 1927 when 1,113,330 tons were exported. In 1930, Canadian mines shipped 624,512 tons to points outside of Canada, and in 1933 external shipments declined to 259,233 tons. Nova Scotia and New Brunswick ports cleared 171,814 tons of Canadian coal in 1933 and Manitoba, Saskatchewan, Alberta and British Columbia ports, 87,419 tons.

Canada imported 11,465,976 tons of coal in 1933, a decline of 1.8 per cent from the 1932 total and 15.3 per cent from the 1931 imports. Receipts of anthracite coal in 1933 totalled 3,035,613 tons, consisting of 1,605,776 tons from Great Britain, 1,429,829 tons from the United States, 6 tons from China, and 2 tons from Alaska. An important development of the year may be noted from these figures, as imports from Great Britain exceeded those from the United States and accounted for 52.9 per cent of the total Canadian anthracite supply. In 1932, the United States supplied 53.7 per cent of Canada's anthracite requirements and in 1930, approximately

Table 167.—Wage-earners Employed in the Coal Mines of Canada, by Classes and by Provinces, 1933, with Comparative Totals for 1932

Classification	Province							Canada		
	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Surface	Under-ground	Total
Administration.....	58	16		9	66	12		160	1	161
Officials, foremen and clerks.....	664	31	1	89	602	188	1	529	1,047	1,576
Screenmen and loaders.....	649	56	2	91	707	117	1	1,623		1,623
Stripping shovel operators.....				4				4		4
Hand cutters and helpers.....	939	619	5	396	1,916	813	2		4,690	4,690
Machine cutters and helpers.....	1,038	68		33	371	115			1,625	1,625
Machine loaders and helpers.....	1,943	11		29	1,632	184			3,799	3,799
Horse haulage employees.....	422	2	1	65	450	192		58	1,074	1,132
Mechanical haulage employees.....	1,456	2		25	351	245		114	1,965	2,079
Ventilation employees.....	247	3		5	71	20		1	345	346
Roadmakers.....	263	7		18	127	40		14	451	455
Pumpmen.....	1,013	25	1	10	232	110		13	1,378	1,391
Timbermen.....	103	4		7	43	18		7	168	175
Loading shovel.....				8				8		8
Chute loaders.....	50				126				184	184
Enginemmen.....	227	13		11	157	63		406	65	471
Firemen.....	132			12	94	38		277		277
Machinists.....	187	1		5	63	38		283	11	294
Carpenters and masons.....	105	6		7	48	39		204	1	205
Other mechanics.....	299	1		5	82	112		266	233	499
Japanese.....						9		1	8	9
Chinese.....						113		110	2	113
All other employees.....	2,066	150		62	833	576		1,365	2,331	3,696
Total for 1933.....	11,861	1,025	10	891	7,971	3,050	4	5,433	19,379	24,812
Total for 1932.....	12,623	709	6	748	7,824	3,684	3	5,553	20,044	25,597

Table 168.—Output of Coal from Canadian Mines, 1924-1933

Year	Short tons	Value	Average per ton
1924.....	13,638,197	\$ 53,593,988	\$ 3.93
1925.....	13,134,968	49,261,951	3.75
1926.....	16,478,131	59,875,094	3.63
1927.....	17,426,861	61,867,463	3.55
1928.....	17,564,293	63,757,833	3.66
1929.....	17,496,557	63,065,170	3.60
1930.....	14,881,324	52,849,748	3.55
1931.....	12,243,211	41,207,682	3.37
1932.....	11,738,913	37,117,695	3.16
1933.....	11,903,344	35,923,962	3.02

Table 169.—Output and Value of Coal in Canada, by Kinds and by Provinces, 1932 and 1933

(Short tons)

Province	1932			1933		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
NOVA SCOTIA (Bituminous).....	38	4,084,581	\$ 15,167,793	36	4,557,590	\$ 15,969,793
NEW BRUNSWICK (Bituminous).....	20	212,695	794,168	34	312,303	1,041,744
MANITOBA (Lignite).....	3	1,552	3,684	2	3,880	9,214
SASKATCHEWAN (Lignite).....	*92	887,139	1,229,449	*106	927,649	1,285,996
ALBERTA—						
Bituminous.....	17	1,734,705	5,715,491	15	1,726,256	5,435,656
Sub-bituminous.....	22	560,902	1,329,316	21	554,118	1,274,017
Lignite.....	†272	2,575,041	6,481,502	†296	2,438,414	5,597,585
Total.....	311	4,870,648	13,526,309	332	4,718,788	12,307,258
BRITISH COLUMBIA (Bituminous).....	28	1,681,490	6,392,801	24	1,382,272	5,306,287
YUKON (Bituminous).....	1	808	3,491	1	862	3,670
CANADA—						
Bituminous.....	104	7,714,279	28,073,744	110	7,979,283	27,757,150
Sub-bituminous.....	22	560,902	1,329,316	21	554,118	1,274,017
Lignite.....	367	3,463,732	7,714,635	404	3,369,943	6,892,795
Total.....	493	11,738,913	37,117,695	535	11,903,344	35,923,962

*Exclusive of 62 small mines in operation during part of 1932 and 93 small mines operating during part of 1933.

†Exclusive of 61 small mines operated under special permits in 1932 and 66 small mines in 1933.

Table 170.—Disposition of Coal from Canadian Mines, 1932 and 1933

	1932			1933		
	Total coal	Total value	Average value per ton	Total coal	Total value	Average value per ton
	Tons	\$	\$	Tons	\$	\$
Supplied to employees for domestic consumption.....	159,050	478,559	3.01	152,724	437,475	2.86
Used for power purposes—						
(a) Shops.....	73,466	260,050	3.54	87,633	312,378	3.57
(b) Colliery boilers.....	562,852	1,479,650	2.63	546,088	1,431,573	2.62
(c) Companies' railroads.....	57,547	208,431	3.62	56,272	200,193	3.56
(d) Harbour tugs and dredges.....						
Shipped. (See Table 172)—						
(a) Ships' bunkers.....	234,231			233,847		
(b) Railroads.....	2,795,106	34,506,363	3.27	2,634,006	33,367,673	3.10
(c) Other.....	7,537,793			7,904,327		
Used in making coke at colliery.....	52,231	180,627	3.46	84,723	249,815	2.95
Used in making briquettes.....	25,912	57,649	2.22	15,886	49,700	3.13
Put on bank.....	626,129	2,187,238	3.49	487,197	1,674,828	3.44
Put on waste heap.....	262,703			230,724		
Total disposition.....	12,387,020	39,358,567	3.18	12,433,427	37,723,635	3.03
Lifted from bank.....	642,331	2,240,872	3.49	518,991	1,799,673	3.47
Lifted from waste heap.....	5,776			11,092		
Total output.....	11,738,913	37,117,695	3.16	11,903,344	35,923,962	3.02

Table 171.—Disposition of Coal from Canadian Mines, by Provinces, 1933
(Short tons)

	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Canada
Supplied to employees for domestic consumption.....	88,608	3,092	48	3,936	40,098	16,938	4	152,724
Coal shipped. (See Table 172).....	4,077,369	305,343	3,832	881,717	4,266,885	1,236,706	328	10,772,180
Used under colliery boilers, etc.....	230,911	2,077		26,442	181,636	105,000	22	546,088
Used by companies' railroads.....	35,437	750		5,445	5,995	8,645		56,272
Used for manufacture of coke at colliery.....					75,276	9,447		84,723
Used in making briquettes.....				953	14,933			15,886
Used in shops, etc.....	87,633							87,633
Used by harbour tugs and dredges.....								
Put on bank.....	402,674	10,080		4,279	38,191	31,933	30	487,197
Put on waste heap.....	41,438	1,098		9,879	137,335	40,496	478	230,724
Total disposition.....	4,964,070	322,450	3,880	932,651	4,760,349	1,449,165	862	12,433,427
Lifted from bank.....	406,480	10,147		5,002	36,742	60,620		518,991
Lifted from waste heap.....					4,819	6,273		11,092
Total output.....	4,557,590	312,303	3,880	927,649	4,718,788	1,382,272	862	11,903,344

Table 172.—Shipments of Coal from Canadian Mines, by Grades and Destinations, 1932 and 1933
(Short tons)

Destination	1932				1933			
	Run-of-mine	Screened	Slack	Total	Run-of-mine	Screened	Slack	Total
Prince Edward Island.....	6,222	58,597	4,323	69,142	4,320	50,873	8,533	63,726
Nova Scotia.....	132,417	356,600	299,031	788,048	110,042	294,894	477,892	882,828
New Brunswick.....	112,020	104,185	220,726	436,931	126,697	110,157	217,649	454,503
Quebec.....	68,816	736,326	782,416	1,587,558	58,128	1,070,384	870,473	1,998,985
Ontario.....	3,537	21,395	4,824	29,756	482	34,361	12,328	47,171
Manitoba.....	141,524	373,375	387,648	902,547	102,054	350,789	452,540	905,383
Saskatchewan.....	285,829	845,137	456,666	1,587,632	280,407	826,470	448,060	1,554,937
Alberta.....	200,692	425,664	480,318	1,106,674	196,888	422,186	471,692	1,090,766
British Columbia.....	18,665	592,352	177,835	788,852	19,362	584,767	132,987	737,116
Yukon.....		341		341		328		328
Total domestic shipments.....	969,722	3,513,972	2,813,787	7,297,481	898,380	3,745,209	3,092,154	7,735,743
Railroads.....	2,196,059	485,236	113,811	2,795,106	2,002,784	523,616	110,859	2,637,259
Ships' bunkers.....	112,438	121,450	343	234,231	162,043	71,804		233,847
Total railroads and ships' bunkers.....	2,308,497	606,686	114,154	3,029,337	2,164,827	595,420	110,859	2,871,106
United States.....	2,164	32,289	78,518	112,971	1,515	18,097	58,131	77,743
Alaska.....		14,779		14,779		14,249		14,249
Newfoundland.....	2,889	107,071	1,220	111,180	9,940	61,045	1,359	72,344
Other countries.....	899	483		1,382		955		995
Total external shipments.....	5,952	154,622	79,738	240,312	11,455	94,386	59,490	165,331
Total.....	3,284,171	4,275,280	3,007,679	10,567,130	3,074,662	4,435,015	3,262,503	10,772,180

Table 173.—Imports of Anthracite and Bituminous Coal into Canada from Great Britain, by Grades and by Provinces, 1932 and 1933

(Short tons)

Destination	1932				1933			
	Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
	Grate, egg, stove, nut, and pea	Screenings, or dust	N.O.P.		Grate, egg, stove, nut, and pea	Screenings, or dust	N.O.P.	
Prince Edward Island.....	2,501		1,364	2,067	2,863			1,677
Nova Scotia.....	43,294			49,274	49,785			59,984
New Brunswick.....	78,287	60	286	15,792	76,391		247	10,790
Quebec.....	1,177,328	5,041	59,335	290,780	1,329,083	2,168	116,608	244,276
Central Ontario.....	26,919			3,001	24,894			1,205
Head of Lakes.....	4,669							
Manitoba.....							150	1,178
Saskatchewan.....								101
British Columbia.....			2	1,154			3,647	18,850
Canada.....	1,332,998	5,101	60,937	362,066	1,482,956	2,168	120,652	338,061

Table 174.—Imports of Anthracite, Bituminous and Lignite Coal into Canada from the United States, by Grades and by Provinces, 1932 and 1933

(Short tons)

Destination	1932					1933				
	Anthracite			Bituminous, all grades	Lignite	Anthracite			Bituminous, all grades	Lignite
	Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.			Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.		
Prince Edward Island....	29		2,005	3,973		678			133	
Nova Scotia.....	10,177			59		7,850			448	
New Brunswick.....	29,309		357	11,349		18,685		267	9,249	
Quebec.....	348,654	6,711	52,640	470,781		234,910	5,761	43,128	433,706	
Ontario.....	1,121,633	3,530	106,684	7,667,071		1,001,561	2,273	109,063	7,624,429	
Manitoba.....	3,800			12,298	156	1,804	95	3,620	12,035	292
Saskatchewan.....				1,459	17		32	25	1,226	317
Alberta.....			3	830				75	998	
British Columbia.....				2,424	2,831			2	7,220	2,098
Yukon.....				4					7	
Canada.....	1,513,602	10,241	161,689	8,170,248	3,004	1,265,488	8,161	156,180	8,089,451	2,707

Table 175.—Imports of Anthracite and Bituminous Coal into Canada from Other Countries, by Provinces, 1932 and 1933

(Short tons)

Destination	Source	1932				1933			
		Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
		Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.		Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.	
New Brunswick.....	Belgium.....	650							
Quebec.....	Germany.....	52,189							144
British Columbia.....	Newfoundland.....				2				
	Alaska.....								2
	China.....								6
	French East Indies.....			700					
Canada.....		52,839		700	2			8	144

Table 176.—Average Imports of Coal into Canada, by Kinds and by Provinces, for the Five Years, 1929-1933

(Short tons)

Destination	Anthracite			Total bituminous	Lignite	Total all grades
	Grate, egg, stove, nut and pea	Other	Total			
Prince Edward Island.....	5,274	1,692	6,966	5,599		12,565
Nova Scotia.....	60,919	19	60,938	45,504		106,442
New Brunswick.....	101,511	1,171	102,682	46,599		149,281
Quebec.....	1,504,186	151,246	1,655,432	989,018		2,644,450
Central Ontario.....	1,531,826	132,673	1,664,499	8,885,702		10,550,201
Head of Lakes.....	25,560	1,977	27,537	1,041,212		1,068,749
Total Ontario.....	1,557,386	134,650	1,692,036	9,926,914		11,618,950
Manitoba.....	3,897	2,236	6,133	19,250	469	25,832
Manitoba and Head of Lakes.....	29,457	4,213	33,670	1,060,462	469	1,094,601
Saskatchewan.....	146	12	158	1,723	227	2,108
Alberta.....		16	16	1,084		1,100
British Columbia.....	343	879	1,222	11,857	8,285	21,364
Yukon.....				19		19
Canada.....	3,233,662	291,921	3,525,583	11,047,567	8,981	14,582,131

Table 177.—Exports of Canadian Coal by Destinations, 1931-1933

(Compiled in the *External Trade Branch*)

Destination	1931		1932		1933	
	Short tons	Value	Short tons	Value	Short tons	Value
BRITISH EMPIRE		\$		\$		\$
United Kingdom.....	10,488	70,508	8,575	53,811	8,918	50,585
Irish Free State.....	186	1,163	1,426	8,354	1,753	9,072
British South Africa.....	2,951	17,706	1,607	9,642	5,403	29,466
Bermuda.....			44	352	35	262
British Guiana.....	1,056	7,920				
British West Indies—						
Jamaica.....					282	2,115
Gibraltar.....	992	5,949	439	2,634		
Malta.....	1,246	6,230				
Newfoundland.....	112,663	616,101	87,539	466,936	79,995	389,032
Sierra Leone.....	1,211	7,266	3,525	20,250		
Australia.....	12,637	104,884	13,472	98,506	23,759	152,082
New Zealand.....	3,477	19,533			2,116	11,109
Total British Empire.....	146,907	857,260	116,627	660,485	122,261	643,723
FOREIGN COUNTRIES						
Argentina.....	7,871	47,229	71	515		
Belgium.....	477	2,862	1,570	8,504	1,038	5,814
Brazil.....	3,947	27,095			822	4,521
China.....	423	3,511	6,815	50,744	308	2,006
Cuba.....	400	2,400	1,502	9,052	443	2,497
Denmark.....			30	225		
France.....	3,246	18,287	999	5,253	1,463	8,173
French Possessions—						
French Africa.....			447	2,682		
St. Pierre and Miquelon.....	4,560	27,097	3,090	19,069	2,727	13,374
Germany.....	536	3,213			123	673
Greece.....	2,472	14,432	726	4,964		
Italy.....	1,589	9,592	307	1,689	84	630
Japan.....	1,862	11,741	3,523	26,593	3,765	16,780
Netherlands.....	1,592	8,702	2,098	11,011	891	3,932
Norway.....	1,729	7,347				
Peru.....	3,309	22,233	976	6,743		
Portuguese Africa.....					1,448	7,964
Spain.....			161	960		
Sweden.....					406	2,233
United States.....	163,351	743,533	135,698	556,127	108,263	375,150
Alaska.....	15,582	103,388	10,847	68,420	14,583	96,710
Puerto Rico.....					608	4,045
Total foreign countries.....	212,946	1,052,662	168,860	772,551	136,972	544,502
Total.....	359,853	1,909,922	285,487	1,433,036	259,233	1,188,225

Table 178.—Annual Consumption of Coal in Canada, 1924-1933

Calendar year	Canadian*		Imported coal "entered for consumption"				Total	Per capita
			From U.S.A.	From Great Britain	Total†			
	Short tons	%	Short tons	Short tons	Short tons	%	Short tons	
1924.....	12,529,358	42.8	16,405,344	317,112	16,714,143	57.2	29,243,501	3.199
1925.....	12,125,290	42.6	15,744,957	604,117	16,331,971	57.4	28,457,261	3.062
1926.....	15,086,296	47.7	16,204,405	287,299	16,565,555	52.3	31,651,851	3.349
1927.....	15,944,983	46.7	17,266,434	907,220	18,177,303	53.3	34,122,286	3.541
1928.....	16,487,807	50.0	15,830,688	682,755	16,515,582	50.0	33,003,389	3.356
1929.....	16,387,461	48.0	16,780,452	843,502	17,724,132	52.0	34,111,593	3.402
1930.....	14,052,671	43.3	16,971,933	1,144,861	18,412,039	56.7	32,464,710	3.181
1931.....	11,682,779	47.7	11,793,798	987,442	12,828,327	52.3	24,511,106	2.362
1932.....	11,212,701	49.0	9,889,866	1,727,716	11,654,492	51.0	22,867,193	2.177
1933.....	11,456,273	51.5	8,865,935	1,942,875	10,808,962	48.5	22,265,235	2.085

*The sum of Canadian coal mine sales, colliery consumption, coal supplied to employees, and coal used in making coke, etc., less the tonnage of coal exported.

†Includes small tonnages from countries other than Great Britain and the United States. Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ships' stores.

Table 179.—Summary Statistics for 1933—Output, Exports, Interprovincial Shipments, Imports and Coal made Available for Consumption in Canada, by Provinces

(Short tons)

Province	Canadian coal				Im-ported from U.S.A.	Im-ported from Great Britain	Im-ported from Germany	Im-ported from China	Im-ported from Alaska	Coal available for consumption
	Output	Received from other provinces	Shipped to other provinces	Ex-ported						
PRINCE EDWARD ISLAND—										
Anthracite.....					678	2,863				3,541
Bituminous.....		63,726			133	1,677				65,536
Total.....		63,726			811	4,540				69,077
NOVA SCOTIA—										
Anthracite.....					7,850	49,785				57,635
Bituminous.....	4,557,590	2,158	2,387,032	116,098	448	59,984				2,117,050
Total.....	4,557,590	2,158	2,387,032	116,098	8,298	109,769				2,174,685
NEW BRUNSWICK—										
Anthracite.....					18,952	76,578				95,530
Bituminous.....	312,303	320,391	5,711	55,716	9,249	10,790	144			591,450
Total.....	312,303	320,391	5,711	55,716	28,201	87,368	144			686,980
QUEBEC—										
Anthracite.....					283,799	1,447,859				1,731,658
Bituminous.....		1,998,953			433,706	244,276				2,676,935
Sub-bituminous.....		32								32
Total.....		1,998,985			717,505	1,692,135				4,408,625
CENTRAL ONTARIO—										
Anthracite.....					1,104,155	24,894				1,129,049
Bituminous.....		9,658			7,067,289	1,205				7,078,152
Sub-bituminous.....		*19,166								19,166
Lignite.....		*18,347								18,347
Total.....		47,171			8,171,444	26,099				8,244,714
MANITOBA AND HEAD OF LAKES—										
Anthracite.....					14,261	150				14,411
Bituminous.....		215,957		24	569,175	1,178				786,286
Sub-bituminous.....		66,256								66,256
Lignite.....	3,880	619,338		1,194	292					622,316
Total.....	3,880	901,551		1,218	583,728	1,328				1,489,269

Table 179.—Summary Statistics for 1933—Output, Exports, Interprovincial Shipments, Imports and Coal made Available for Consumption in Canada, by Provinces—Con.

Province	Canadian coal				Im- ported from U.S.A.	Im- ported from Great Britain	Im- ported from Ger- many	Im- ported from China	Im- ported from Alaska	Coal available for con- sumption
	Output	Received from other provinces	Shipped to other provinces	Ex- ported						
SASKATCHEWAN—										
Anthracite.....					57					57
Bituminous.....		94,247		21	1,226	101				95,553
Sub-bituminous.....		21,707								21,707
Lignite.....	927,649	961,774	376,922	3,692	317					1,509,126
Total.....	927,649	1,077,728	376,922	3,713	1,600	101				1,626,443
ALBERTA—										
Anthracite.....					75					75
Bituminous.....	1,726,256	5,921	240,141	310	998					1,492,724
Sub-bituminous.....	554,118		140,196							413,922
Lignite.....	2,438,414		1,286,502	816						1,151,096
Total.....	4,718,788	5,921	1,666,839	1,126	1,073					3,057,817
BRITISH COLUMBIA—										
Anthracite.....					2	3,647		6	2	3,657
Bituminous.....	1,382,272	19,723	97,850	75,295	7,220	18,850				1,254,920
Sub-bituminous.....		33,035								33,035
Lignite.....		63,965		6,067	2,098					59,996
Total.....	1,382,272	116,723	97,850	81,362	9,320	22,497		6	2	1,351,608
YUKON—										
Bituminous.....	862				7					869
Total.....	862				7					869
Canada—										
Anthracite.....					1,429,829	1,605,776		6	2	3,035,613
Bituminous.....	7,979,283	2,730,734	2,730,734	247,464	8,089,451	338,061	144			16,159,475
Sub-bituminous.....	554,118	140,196	140,196							554,118
Lignite.....	3,369,943	1,663,424	1,663,424	11,769	2,707					3,360,881
Total.....	11,903,344	4,534,354	4,534,354	259,233	9,521,987	1,943,837	144	6	2	23,110,087

*Shipments to any point in Ontario from western mines.

Table 180.—World Production of Coal*, 1929-1933

(Including brown coal)
(Long tons)

Country	1929	1930	1931	1932	1933
BRITISH EMPIRE					
Great Britain—					
Anthracite.....	6,364,036	6,400,705	5,829,175	6,616,972	7,053,043
Bituminous.....	251,542,766	237,481,119	213,629,776	202,116,168	200,059,200
Lignite.....	322				
Irish Free State—					
Anthracite.....	67,734	†	73,393		
Semi-bituminous.....	17,453	†	18,347	81,000	105,000
Nigeria.....	344,937	347,842	327,681	252,485	235,133
Southern Rhodesia.....	1,020,446	923,915	577,983	431,183	476,340
Union of South Africa.....	12,812,790	12,029,529	10,709,114	9,764,425	10,545,197
Canada—					
Bituminous.....	11,481,984	9,665,035	7,911,929	6,887,749	7,124,360
Sub-bituminous.....	597,055	538,713	420,842	500,805	494,748
Lignite.....	3,542,887	3,083,149	2,598,668	3,092,618	3,008,878
British Borneo—					
State of North Borneo.....	58,339	58,491	28,926		
Sarawak.....	13,610	14,680	18,213		
Federated Malay States.....	661,514	565,573	402,355	277,848	234,410
India—					
Gondwana Coalfields.....	23,001,586	23,342,372	21,331,872	19,814,524	19,456,254
Tertiary Coalfields.....	417,148	460,676	384,563	338,863	332,909
Used by miners.....	†	†	543,000	504,000	495,000
Australia—					
Bituminous.....	10,365,319	9,531,359	8,401,260	8,585,858	9,091,976
Lignite.....	1,741,176	1,831,507	2,194,453	2,612,512	2,580,060
New Zealand—					
Bituminous.....	1,367,164	1,382,875	979,636	928,234	843,845
Brown coal.....	1,049,603	1,046,677	1,069,749	806,397	860,238
Lignite.....	119,097	112,540	108,371	107,391	117,175
Total British Empire.....	327,000,000	309,000,000	278,000,000	264,000,000	263,000,000

Table 180.—World Production of Coal*, 1929-1933—Continued

(Including brown coal)

(Long tons)

	1929	1930	1931	1932	1933
FOREIGN COUNTRIES					
Albania—					
Lignite.....		4,215	3,109	†	†
Austria—					
Bituminous.....	204,735	212,478	224,541	217,819	235,150
Brown coal.....	3,469,123	3,014,665	2,934,978	3,055,021	2,966,862
Belgium—					
Anthracite and semi-anthracite.....	5,826,029	5,710,956	5,865,653	4,656,753	24,878,454
Bituminous.....	20,688,421	21,270,796	20,749,689	16,428,442	
Bulgaria—					
Anthracite.....	2,479	2,303	6,117	3,075	1,452,474
Bituminous.....	75,130	62,312	78,161	93,758	
Brown coal.....	1,548,121	1,498,345	1,414,217	1,636,501	
Czechoslovakia—					
Bituminous.....	16,260,524	14,207,021	12,895,773	10,787,907	10,365,655
Brown coal.....	22,204,480	18,890,532	17,648,430	15,607,935	14,825,194
France—					
Saar.....	13,364,882	13,026,730	11,187,485	10,273,195	10,394,373
Other districts—					
Anthracite and bituminous (a).....	52,930,400	53,049,020	49,220,890	45,535,513	46,113,162
Lignite.....	1,178,329	1,138,235	1,018,575	975,695	1,071,102
Germany—					
Bituminous.....	160,859,314	140,444,006	116,766,357	103,086,309	107,959,643
Lignite.....	171,700,657	143,704,018	131,205,263	120,709,596	124,791,923
Greece—					
Lignite.....	154,054	127,576	103,546	135,410	†
Hungary—					
Bituminous.....	813,220	798,731	764,150	880,674	787,418
Brown coal.....	6,659,925	5,746,586	5,650,352	5,395,064	5,393,595
Lignite.....	272,765	332,348	364,451	442,726	†
Italy—					
Anthracite.....	14,007	19,530	15,331	47,004	66,644
Bituminous.....	205,813	207,946	216,640	204,390	262,439
Brown coal.....	769,694	567,750	358,730	370,107	376,712
Jugoslavia—					
Bituminous.....	435,131	360,430	399,914	362,187	377,432
Brown coal.....	4,326,603	3,748,858	3,467,492	3,030,987	2,806,202
Lignite.....	1,036,945	1,077,869	1,040,425	1,010,853	905,274
Netherlands—					
Bituminous.....	11,398,293	12,018,229	12,697,631	12,554,978	12,375,372
Brown coal.....	154,095	141,873	120,269	122,115	95,511
Poland—					
Bituminous.....	45,505,803	36,914,000	37,660,667	28,379,163	26,924,235
Brown coal.....	73,147	54,000	38,800	32,900	32,865
Portugal—					
Anthracite.....	175,864	183,471		187,632	205,399
Bituminous.....	18,068	27,345	223,475	49,753	19,426
Brown coal.....	28,880	35,928		16,043	11,291
Roumania—					
Anthracite.....				12,052	194,000
Bituminous.....	365,088	294,105	282,005	172,992	1,267,000
Lignite.....	2,632,831	2,038,348	1,606,088	1,440,807	
Russia—					
Anthracite.....					
Bituminous—					
European.....	40,711,700	47,635,600	55,737,000	63,299,000	74,295,000
Asiatic.....					
Brown coal.....					
Spain—					
Anthracite.....	491,851	515,306	516,402	539,110	563,399
Bituminous.....	6,504,199	6,492,054	6,462,526	6,206,607	5,340,855
Brown coal.....	432,018	381,904	336,073	330,981	296,260
Spitzbergen and Bear Island.....	247,218	185,443	239,267	250,000	275,000
Sweden.....	388,737	391,675	337,777	327,816	343,410
Switzerland (b).....		4,000	4,000	4,000	4,000
Algeria—Bituminous.....	15,873	16,922	25,186	24,584	29,948
Belgian Congo.....	112,642	131,700	84,359	17,000	
Madagascar.....	25				
Morocco (French)—					
Anthracite.....		965	5,574	14,724	26,848
Mozambique.....	†	†	†	19,430	10,000
Greenland.....	3,500	4,700	4,600	†	†
Mexico.....	1,043,277	1,273,818	907,723	642,314	556,144
United States—					
Anthracite.....	65,918,031	61,950,747	53,255,046	44,513,590	44,233,343
Bituminous and lignite.....	477,668,387	417,434,196	341,151,246	276,526,671	297,884,404
Brazil.....	167,251	359,673	454,061	490,288	552,252
Chile.....	1,484,051	1,419,367	1,083,004	1,068,100	1,516,283
Colombia (estimated).....	100,000	200,000	200,000	200,000	200,000
Peru.....	217,120	196,855	138,332	26,500	29,500
Venezuela (c).....	16,593	12,360	3,000	†	†
China (d).....	25,437,000	26,037,000	17,741,573	18,370,000	19,143,000
Dutch East Indies.....	1,802,811	1,841,278	1,382,223	1,033,639	1,025,390
Formosa.....	1,505,860	1,573,478	1,399,093	1,335,595	†

Table 180.—World Production of Coal*, 1929-1933—Concluded

(Including brown coal)

(Short tons)

—	1929	1930	1931	1932	1933
FOREIGN COUNTRIES—Concluded					
French Indo-China—					
Anthracite.....	1,872,373	1,860,000	1,650,000	1,640,637	1,517,861
Bituminous.....	38,277	47,000	28,000	22,328	25,508
Brown coal.....	30,228	28,000	23,000	23,091	22,644
Japan—					
Semi-anthracite.....	33,716,762	30,880,669	27,545,251	27,610,311	32,010,079
Bituminous.....					
Brown coal.....					
Karafuto.....	137,000	126,593	115,881	106,818	113,958
Philippine Islands.....	625,478	634,788	627,886	666,691	874,874
Korea—					
Anthracite.....	529,744	870,174	904,000	1,086,755	1,286,096
Bituminous.....	393,345				
"Manchoukuo".....	†	†	8,984,200	7,992,000	900,549
Philippine Islands.....	17,047	20,423	18,668	†	†
Turkey in Asia—					
Bituminous.....	1,398,565	1,569,966	1,549,230	1,568,411	1,830,607
Lignite.....	11,375	9,241	7,652	13,346	29,094
New Caledonia—Anthracite.....	21,000	9,517	†	†	†
Total Foreign countries.....	1,210,000,000	1,080,000,000	960,000,000	850,000,000	880,000,000
Grand Total.....	1,540,000,000	1,390,000,000	1,240,000,000	1,110,000,000	1,140,000,000

*Data obtained from *The Mineral Industry of the British Empire and Foreign Countries*.

†Information not available.

(a) Includes about 5,000,000 tons of anthracite each year.

(b) United States Bureau of Mines estimate.

(c) Excluding production in government owned mines.

(d) Of which about 3,000,000 tons are anthracite and 300,000 tons are lignite.

THE COKE AND ARTIFICIAL GAS INDUSTRY

The coke and artificial gas industry in Canada in 1933 included the operations of 42 establishments with a total capital investment of \$94,225,476. Employment was furnished by these plants to 3,526 employees, who received \$4,606,308 in salaries and wages.

The output of gas-house, by-product and beehive coke during the year totalled 1,772,164 tons as compared with 1,637,701 tons in 1932. Production by the eight by-product plants and the two beehive oven plants amounted to 1,500,448 tons in 1933, while the 23 artificial gas plants produced only 271,716 tons. In addition, 74,725 tons of petroleum coke were recovered as a by-product in petroleum refining.

Artificial gas production in 1933 totalled 29,125,295 thousand cubic feet, consisting of 20,054,910 thousand cubic feet from by-product coke ovens and 9,070,385 thousand cubic feet from gas plants. Sales of gas by the producers amounted to 15,893,248 thousand cubic feet worth \$11,839,345; most of the remaining gas was used as a fuel in the producing plants or in associated metallurgical works. Petroleum refineries produced 3,505,405 thousand cubic feet of still gas for their own use in 1933.

Imports of gas-house and by-product coke declined to 644,075 tons from the 1932 total of 651,802 tons. Exports of gas-house and by-product coke in 1933 were recorded at 5,199 tons as against 15,469 tons in the preceding year. Petroleum coke exportations amounted to 16,375 tons in 1933.

The number of customers served by the producers of illuminating and fuel gas in 1933 was 513,033; the number of active meters was 495,855 and the length of distributing mains was 3,880 miles (6,296 miles in terms of 3 inch pipe). The calorific value of the gas ranged from 450 to 550 B.T.U. per cubic foot.

Table 181.—Materials used in the Coke and Gas Industry in Canada, 1931-1933

Materials	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Bituminous coal:—						
Canadian..... tons	564,882	2,346,667	449,264	2,175,573	604,017	2,491,991
Foreign..... tons	1,967,654	9,349,162	1,767,748	8,134,302	1,861,944	8,405,030
Coke for gas-making—						
Purchased..... tons	5,238	47,494	4,507	42,225	4,614	43,343
Companies' own make..... tons	130,272	973,079	118,338	854,525	108,654	732,662
Oil used for enriching water gas..... imp. gal.			9,849,710	580,816	9,558,945	610,147
Oil used for making oil gas..... imp. gal.	10,935,971	717,474	1,796,878	109,522	756,410	56,546
Absorbing and wash oil..... imp. gal.			135,816	14,294	261,583	33,796
Caustic soda..... lb.			201,981	6,499	334,452	12,643
Calcium carbide..... lb.	40,000	1,775	40,000	1,691	28,000	1,236
Lime..... tons	1,425	13,475	691	5,728	1,374	8,784
Water.....		32,713		16,197		15,672
Oxide or purifying materials..... tons	5,362	50,029	3,736	35,284	2,734	29,076
Sulphuric acid, 66° Bé..... lb.	29,926,099	227,223	19,062,397	124,787	28,905,528	187,420
All other materials.....		134,970		140,255		100,729
Total cost.....		13,894,061		12,241,698		12,729,075

Table 182.—Production in Canada, Imports and Exports of Coke and Its By-Products, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Coke						
Production—by provinces—						
Nova Scotia, New Brunswick and Quebec..... tons	538,126	3,887,746	403,330	3,115,737	445,755	2,840,433
Ontario..... tons	1,113,509	7,163,526	1,087,122	7,876,941	1,153,509	8,429,660
Manitoba, Alberta and British Columbia..... tons	181,065	1,368,469	147,249	1,101,827	172,900	1,196,102
Total..... tons	1,832,700	12,419,741	1,637,701	12,094,505	1,772,164	12,466,195
IMPORTS..... tons	733,274		651,802		644,075	
EXPORTS..... tons	20,905	153,415	15,469	114,459	5,199	36,381
AVAILABLE FOR CONSUMPTION..... tons	2,545,069		2,274,034		2,411,040	
Other products						
*PRODUCTION—						
Ammonium sulphate..... tons	21,869	608,922	11,050	212,182	16,723	318,973
Gas: (a) Sales..... M cu. ft.	17,111,432	13,010,733	17,083,631	12,895,039	15,893,248	11,839,345
(b) Used in own plants..... M cu. ft.	4,974,874	1,174,380	6,274,218	1,392,273	7,166,473	1,668,524
(c) Used in associated metallurgical works..... M cu. ft.	7,316,392	881,481	4,300,510	686,498	6,314,165	908,697
(d) Gas otherwise accounted for, but not sold..... M cu. ft.	180,928	59,975	160,947	58,258	133,329	46,619
(e) Not accounted for..... M cu. ft.	959,335	1,059,085	781,796	816,696	844,069	881,654
Benzol..... imp. gals.	3,164,205	576,456	2,331,171	475,300	2,645,649	552,595
Light oils..... imp. gal.				184	57,825	61,250
Tar..... imp. gal.	22,271,880	1,426,537	20,176,843	1,158,506	21,292,622	1,172,797
Ammonia liquor..... pound N H ₃	2,266,221	29,058	1,700,152	20,352	1,607,326	18,729
All other products.....		3,092		2,857		1,597
IMPORTS—						
Ammonium sulphate..... tons	12,830	369,254	13,811	280,026	4,156	100,415
Coal tar and pitch..... gal.		155,861	1,807,946	103,983	371,967	42,663
EXPORTS—						
Ammonium sulphate..... tons	5,627	167,477	38,741	701,707	62,383	1,081,392
Coal tar and pitch..... gal.	2,880,018	131,129	3,017,552	203,126	8,513,031	495,999

*Production data include the output of the Coke and its By-Products Industry and of the Illuminating and Fuel Gas Industry.

THE NATURAL GAS INDUSTRY

The Canadian production of natural gas during 1933 declined to 23,138,103 thousand cubic feet valued at \$8,712,234 from the 1932 total of 23,420,174 thousand cubic feet worth \$8,899,462.

Alberta was the leading gas producing province, with an output of 15,352,811 thousand cubic feet; Ontario followed with 7,166,659 thousand cubic feet, and New Brunswick came next with 618,033 thousand cubic feet. As usual, there was a small output from several private wells in Manitoba.

New Brunswick's supply of natural gas is obtained from wells in the Stony Creek field, near Moncton. Industrial and domestic users in Moncton and Hillsborough are served with gas from this field. One new producing well was completed in 1933 and one well was deepened. In addition, two dry wells were drilled during the year, while drilling operations were suspended for the winter in a test well.

An extract from a report by the New Brunswick Gas & Oilfields Limited, the operating company in this province, reads as follows:—

"Since 1919 this company has investigated the various modern methods of geophysical surveying as applied to oil development, and, following the experimental work carried out in 1930 by our Dr. J. A. L. Henderson, south of Moncton, the geo-magnetic method was considered by him to be the only one applicable with any reasonable hope of useful results, for the complex conditions existing in New Brunswick. To test the suitability of this method a series of preliminary geo-magnetic traverses were carried out in September, 1932, under the aegis of the Federal and Provincial governments in co-operation with this company. The results were encouraging enough to warrant this company in continuing the work itself in 1933. Special instruments of the latest type were made in England and this work has been energetically prosecuted since early in June and has continued uninterruptedly throughout the summer and autumn months."

In Quebec, according to a provincial government report, a deep well was drilled on lot 160 of Petit Bois range, in the parish of St. Angèle de Laval, Nicolet county. This well, unexpectedly, entered the pre-Cambrian at 5,100 feet; drilling was continued to 5,280 feet and then the well was "shot" at 4,955 feet on August 5th. There was no increase in the flow of gas, so the well was abandoned. North of the St. Lawrence three shallow wells were drilled in the counties of L'Assomption and Joliette; a small flow of gas was obtained from these wells.

Natural gas production in Ontario declined 3.0 per cent in 1933 to 7,166,659 thousand cubic feet as compared with 7,386,154 thousand cubic feet a year ago. In the Tilbury field there was a reduction of approximately 200,000 thousand cubic feet during the year: Production in the Haldimand field increased about 70,000 thousand cubic feet and in the Dawn field 100,000 thousand cubic feet.

Col. R. B. Harkness, Commissioner of Gas for Ontario, reports that there was little exploratory drilling in 1933. One well was drilled in Maidstone township, Essex county; one in Orford township, Kent county; one in Chatham Gore, Kent county; one in Ekfrid township, Middlesex county, and one in Puslinch township, Wellington county. Further drilling was carried out in an endeavour to enlarge the fields in Raleigh township, Kent county; Dawn township, Lambton county; Middleton township, Norfolk county, and in Tuscarora, Indian Reserve, Brant county. Some drilling was done also within the limits of the Haldimand, Norfolk and Welland fields. Altogether 173 producing wells were drilled in 1933 as compared with 151 in 1932 and 196 in 1931; the open flow from the new wells completed in 1933 was 15,826 thousand cubic feet as against the 1932 total of 8,870 thousand cubic feet and the 1931 new flow of 45,123 thousand cubic feet. Over 90 per cent of the wells drilled were owned by small independent producing companies who drill under contract to sell their output to a distributing company. The greatest activity was in Walpole township, where the success in 1932 stimulated interest.

At the close of the year 2,708 wells were producing gas in Ontario. Sixty-seven dry wells were drilled during the year and 55 wells were abandoned.

The total capital employed by all companies operating in this industry in Ontario during 1933 amounted to \$51,744,194. Employment was furnished 940 salaried employees and wage-earners who received a total remuneration of \$1,021,656.

Alberta's production of natural gas in 1933 totalled 15,352,811 thousand cubic feet; this represented a decline of 0.1 per cent from the preceding year's output of 15,370,968 thousand cubic feet. These figures include only the natural gas consumed for industrial and domestic purposes and do not take into account the waste gas burned in the Turner Valley field and the gas piped to the Bow Island field for storage.

The Turner Valley field, which is located about 35 miles southwest of Calgary, was the largest natural gas producing area in Canada in 1933. Natural gas produced in this field and consumed during the year amounted to 9,846,431 thousand cubic feet as against 9,605,705 thousand cubic feet in 1932 and 12,242,037 thousand cubic feet in 1931. Approximately 22,700 consumers in Calgary, Lethbridge and the district were served with this gas in 1933. In addition considerable quantities were used in the field for drilling purposes. Continuing the practice of the past several years, a large quantity of gas from this field was piped into the exhausted sands of the Bow Island field for storage.

The city of Medicine Hat consumed 2,149,535 thousand cubic feet of natural gas in 1933; during the preceding year, 2,139,534 thousand cubic feet were used. Thirty wells in the Medicine Hat field supplied gas to about 2,500 industrial and domestic consumers. The Redcliff field, located about two miles west of Medicine Hat, supplied gas to consumers in Redcliff.

About 10,000 users in Edmonton were furnished with gas from the Viking field, which is about 80 miles southeast of the city. In addition, some 500 consumers outside of Edmonton were supplied with gas from this field.

Approximately 300 users in Wainwright were supplied with gas from the Maple Leaf well in the Fabyan field.

Imports of mixed gas (natural and artificial) into Canada from the United States in 1933 amounted to 100,854 thousand cubic feet worth \$73,435; in 1932 importations totalled 120,840 thousand cubic feet appraised at \$91,234.

The 174 firms operating in the natural gas industry in Canada during 1933 reported a capital investment of \$80,937,170. This industry employed 1,367 salaried employees and wage-earners who received a total remuneration of \$1,650,815. The cost of fuel and electricity used during the year was \$53,994.

Table 183.—Production of Natural Gas in Canada, by Provinces, 1924-1933

(For the years 1892 to 1923 see Mineral Production of Canada, 1928)

Year	New Brunswick		Ontario		Manitoba		Alberta		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$		\$
1924.....	599,972	113,577	7,150,078	3,798,381	200	60	7,131,086	1,796,618	14,881,336	5,708,636
1925.....	639,235	122,394	7,143,962	3,958,006	200	60	9,119,500	2,752,545	16,902,897	6,833,005
1926.....	648,316	128,300	7,764,996	4,409,593	200	60	10,794,697	3,019,221	19,208,209	7,557,174
1927.....	630,755	124,637	7,311,215	4,331,780	200	60	13,434,621	3,586,533	21,376,791	8,043,010
1928.....	660,981	324,344	7,632,800	4,535,312	200	60	14,288,605	3,754,466	22,582,586	8,614,182
1929.....	678,456	333,002	8,586,475	4,959,695	600	180	19,112,931	4,684,247	28,378,462	9,977,124
1930.....	661,975	325,751	7,965,761	5,034,828	600	180	20,748,583	4,929,226	29,376,919	10,289,985
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,037,893	25,874,723	9,026,754
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794	23,420,174	8,899,462
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263	23,138,103	8,712,234

Table 184.—Production of Natural Gas in Canada, by Months, 1933

Month	New Brunswick	Ontario	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	73,616	862,234	1,998,061	2,933,911
February.....	76,626	844,264	1,896,421	2,817,311
March.....	75,913	802,263	1,615,057	2,493,233
April.....	68,014	811,707	1,345,025	2,224,746
May.....	52,405	627,211	1,011,814	1,691,430
June.....	36,642	330,698	760,041	1,127,681 (a)
July.....	25,065	293,843	679,620	998,528
August.....	20,395	284,066	637,282	941,743
September.....	24,544	331,542	792,475	1,148,561
October.....	33,854	495,028	1,120,769	1,649,651
November.....	57,134	590,316	1,483,640	2,131,090
December.....	73,825	893,487	2,012,606	2,980,218 (a)
Total.....	618,033	7,166,659	15,352,811	23,138,103 (a)

(a) Includes small production from Manitoba.

Table 185.—Natural Gas Production in Ontario, by Fields, 1932 and 1933(a)

County	Fields	1932	1933
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	4,506,072	4,201,704
Kent.....	Tilbury and Dover.....	275,958	252,694
Lambton.....	Dawn and Oil Springs.....	170,671	265,061
Elgin.....	Bayham.....	45,708	45,968
Norfolk.....	Norfolk.....	365,638	346,621
Lincoln.....	Lincoln.....	1,453,864	1,524,251
Haldimand.....	Haldimand.....		
Wentworth.....	Wentworth.....	140,612	121,578
Brant.....	Onondaga.....		
Bruce.....	Amabel.....	500	500
Welland.....	Welland.....	351,616	333,619
Wells in surface drift.....	Howard and Sarnia.....	15,515	14,663
Private wells.....		60,000	60,000
Total produced.....		7,386,154	7,166,659
Value.....		\$ 4,719,297	4,523,084
Imported mixed gas.....	M cu. ft.	111,727	97,075
Total distributed.....	M cu. ft.	7,497,881	7,263,734

(a) Prepared by the Ontario Department of Mines.

Table 186.—Number of Gas Wells in Canada, by Provinces, 1931, 1932 and 1933

	New Brunswick	Ontario	Manitoba	Alberta	Canada
Productive wells at beginning of year.....	1931 28	2,108	6	85	2,227
	1932 28	2,266	6	90	2,390
	1933 30	2,620	6	89	2,745
Number of productive wells drilled.....	1931.....	196		6	202
	1932 2	151		4	157
	1933 1	173			174
Number of dry wells drilled.....	1931 1	81		1	83
	1932 2	32			34
	1933 2	67			69
Number of wells abandoned.....	1931.....	52			52
	1932.....	42		3	45
	1933.....	55			55
Productive wells at end of year.....	1931 28	2,266	6	87	2,387
	1932 30	2,620	6	89	2,745
	1933 31	2,708	6	87	2,832

Table 187.—Natural Gas Wells in Ontario, by Townships, 1932 and 1933

Township	1932				1933			
	No. of producing wells in operation Dec. 31, 1931	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1933	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Amabel.....	2				2			
Bayham.....	35	3			35			
Bertie.....	90	8		6	95			5
Bainbrook.....	54		1	4	53	1		
Caistor.....	62				53			
Camboro.....	166	4	3	34	168	4	2	9
Caradoc.....								
Cayuga, North.....	148		2	10	154	3	2	12
Cayuga, South.....	54	1			53	2		
Charlotteville.....	13	2			13		1	
Chatham Gore.....								
Crowland.....	38				32	12		
Dawn.....	18		1		15		1	3
Dereham.....			1					
Dover, East.....	8	1			8			1
Dover, West.....								
Dunn.....	29			1	49		7	21
Ekfrid.....							1	
Enniskillen.....	4				4			
Euphemia.....					1			
Gainsboro.....	5			1	5			
Glanford.....	11				11			
Gosfield.....	15		2		16			1
Harwich.....								
Houghton.....	7				7			
Humberstone.....	64	1			62	4		
Maidstone.....							1	
Malahide.....	1				1			
Mersea.....	3				3			
Middleton.....	37		1	2	38	2	4	4
Moulton.....	105	4	1	16	106	6	3	14
Oneida.....	47		2	12	50	2	2	4
Onondaga.....	38	2		2	39			
Orford.....							2	
Puslinch.....							1	
Rainham.....	246	1	10	32	269		10	22
Raleigh.....	35		1	2	32		4	1
Romney.....	143	1		1	142	1		
Sarnia.....	13				13			
Seneca.....	174	5	2	14	169	11	6	5
Sherbrooke.....	13		2	1	13			
Tilbury, East.....	142			2	143	1	1	7
Townsend.....	1				1			
Tuscarora.....	54	3	2		64		2	7
Wainfleet.....	27	2			26			1
Walpole.....	224	4		11	270	2	14	50
Walsingham, N.....	13		1		10			1
Walsingham, S.....	9				14			1
Windham.....	8				8			
Willoughby.....	39				41		2	4
Woodhouse.....	56				55	1	1	
Private wells.....	300				296			
Surface wells.....	69				69			
Sombra.....			1					
Total.....	2,620	42	32	151	2,708	55	67	173

Table 188.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1932 and 1933

	1932				1933			
	Quebec	Ontario	Alberta	Canada	Quebec	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—								
Cost of lands, buildings, plant, machinery and tools.....	270,122	39,039,616	25,174,932	64,484,670	73,729	39,458,882	25,263,517	64,796,128
Cost of supplies and stock on hand.....		478,380	205,404	683,784		470,435	213,750	684,185
Cash, trading and operating accounts and bills receivable.....	16,000	6,444,732	1,806,570	8,267,302	50,000	11,814,877	1,801,798	13,666,675
Total.....	286,122	45,962,728	27,186,906	*75,187,066	123,729	51,744,194	27,279,065	†89,937,170

*Includes data for New Brunswick.

†Includes data for New Brunswick and Saskatchewan.

Table 189.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1932 and 1933

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1932					\$	\$	\$
New Brunswick.....	12	6	43	61	27,934	47,218	75,152
Quebec.....	5	3	19	27	10,923	25,420	36,343
Ontario.....	351	92	441	884	634,585	424,958	1,059,543
Alberta.....	75	27	277	379	170,751	397,160	567,911
Canada.....	443	128	780	1,351	844,193	894,756	1,738,949
1933							
New Brunswick.....	13	5	53	71	35,330	61,844	97,174
Quebec.....	1		11	12	4,080	15,345	19,425
Ontario.....	373	96	471	940	616,260	405,396	1,021,656
Saskatchewan.....	1		3	4	150	4,495	4,645
Alberta.....	76	23	241	340	162,132	345,783	507,915
Canada.....	464	124	779	1,367	817,952	832,863	1,650,815

*See footnote on page 24.

THE PEAT INDUSTRY

Peat production in Canada during 1933 amounted to 1,131 tons worth \$3,449; in the preceding year 3,248 tons valued at \$7,593 were produced. The 1933 output was obtained from St. Hyacinthe, Quebec, and Chesterville, Ontario. Peat fuel sales from the St. Hyacinthe bog in 1933 were made from stock on hand, as no operations were carried on during the year. The Chesterville production was sold locally.

Table 190.—Production of Peat in Canada, 1923-1933

Year	Tons	Value
		\$
1923-24.....		
1925.....	1,370	8,394
1926-27.....		
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products.

1. Production of Crude Petroleum

Canadian wells produced 1,145,333 barrels of crude petroleum in 1933 as compared with 1,044,412 barrels in 1932. The 1933 production included 995,832 barrels from Alberta, 136,058 barrels from Ontario, 8,835 barrels from New Brunswick and 4,608 barrels from the Northwest Territories.

Output from Alberta wells consisted of 968,055 barrels of crude naphtha and light crude oil from the Turner Valley field, 23,305 barrels of light crude oil from the Red Coulee, Border and Keho fields, and 4,472 barrels of heavy crude oil from the Wainwright field. Unsold oil at the well-head on December 31st amounted to 20,377 barrels as against 21,101 barrels on hand at the beginning of the year. One hundred and thirteen wells were in operation in Alberta at the close of 1933 and drilling was in progress on 3 other wells in the Turner Valley, Rickert and Two Hills fields. Five wells were brought into production during the year. Approximately 19,000 feet were drilled during 1933 as compared with 12,189 feet in 1932, 80,225 feet in 1931 and 190,125 feet in 1930. Reports received from Alberta operators indicated that 36,937 feet of casing weighing 726 tons were used in 1933; during the preceding year, 32,318 feet weighing 492 tons were used. The value of the casing used in 1933 was \$59,475 as compared with the 1932 valuation of \$39,614 and the 1931 total of \$369,734.

The Mar-Jon Freehold well in South Turner Valley came into production in March with an initial output of 460 barrels per day. In June the Model No. 2 well struck a wet gas flow of 5,000 thousand cubic feet at 5,924 feet or 400 feet in the lime. During September the Miracle No. 2 well was brought into production at 6,800 feet.

Prices for Alberta crude naphtha and oil fluctuated considerably during 1933. The following quotations were published in the Western Oil Examiner:—

	To Jan. 24th	To July 20th	To end of August	To Sept. 11th	From Sept. 11th
	(per barrel)	(per barrel)	(per barrel)	(per barrel)	(per barrel)
Crude naphtha.....	\$3.32	\$2.82	\$2.99	\$3.16	\$3.50
Discoloured naphtha.....	3.08	2.58	2.75	2.92	3.26
Crude oil—50° up.....	2.80	2.41	2.54	2.67	2.93
Crude oil—45° to 49.9°.....	2.18	1.90	1.99	2.08	2.26
Crude oil—40° to 44.9°.....	1.56	1.41	1.46	1.50	1.61

A report on petroleum activities in Alberta, prepared by Mr. W. Calder, of the Petroleum and Natural Gas Division of the Alberta provincial government, reads in part as follows:—

"The increase in the Turner Valley naphtha production was due to part of the wet gas from the limestone formation being processed in an absorption plant which removes the greater portion of the liquid hydrocarbons carried out with the gas at the wells.

"The original capacity of this plant was designed for the processing of 75 million cubic feet of gas per day. The results exceeding the anticipated returns caused the operators of the plant to make certain additions which now permit of a little over 100 million feet of gas being processed daily. The naphtha recovery was further augmented by the drilling in of several new wells.

"The drilling of new wells, which had been practically suspended on account of the depression, was resumed, but most work has been centred in Section 28 of 18-2-W. 5th and adjoining areas at the south end of the Turner Valley. These operations have materially altered the previous views respecting the geology of the area. In the most southerly drilled to date the limestone formation has been encountered at an underground elevation approximately 200 feet higher than that found in wells previously drilled north of this site.

"Drilling in areas distant from the Turner Valley has not been extensive. Excellent indications of light gravity oil were encountered at wells drilled at Keho and Twin River areas in the southern part of the Province. Neither of these finds has yet been thoroughly tested and nothing can be said respecting the potentialities. The only other find of importance was the discovery of an oil-producing sand near Athabasca, the gravity of the oil being 13.1° Beaumé.

Here also, for some unknown reason, a definite test of the productive horizons has not yet been made."

The new absorption plant of the Royalite Oil Company Ltd., in the Turner Valley field processed 21,029,000 thousand cubic feet of natural gas in 1933 to recover 186,000 barrels of natural gasoline. This gasoline was shipped to the Calgary refinery for blending with the refinery run.

Ontario's output of crude petroleum has shown a steady increase during the past three years. In 1933 the production totalled 136,058 barrels as compared with 130,343 barrels in the preceding year, 122,364 barrels in 1931 and 117,302 barrels in 1930. This increase was due, in the main part, to the drilling into production of three deep oil wells in Dawn township.

The discovery of oil in Brooke township, on lot 26, concession XIII, is leading to considerable drilling activity. The oil is at the same horizon and depth as in the Petrolia field. No samples of the rock are available, and, as yet, there is no information as to the porosity of the rock and the thickness of the producing horizon. Further drilling in the vicinity of the well discovered in Mosa township in 1932 has failed to find a producing field.¹

In the search for oil in Ontario during the year, 5,213 feet were drilled as compared with 23,919 feet in 1932. In all, five producing wells and 3 dry wells were drilled during 1933. Two hundred and thirty-seven wells were abandoned during the year. On December 31st, 2,151 wells were producing as against 2,056 wells active on January 1st.

Crude petroleum output from New Brunswick wells rose to 8,835 barrels from the preceding year's total of 6,408 barrels. This production was obtained, as usual, from the Stony Creek field near Moncton. The crude oil was treated in a small topping plant at Weldon, and gasoline and fuel oil were produced.

Production from the Discovery Nos. 1 and 2 wells near Fort Norman, Northwest Territories, totalled 4,608 barrels in 1933. In 1932 the No. 1 well was operated, producing 1,022 barrels, of which 910 barrels were treated at a small refinery near Fort Norman. A considerable part of the gasoline and fuel oil produced is used in connection with mining operations in the Great Bear Lake area.

The total capital employed by companies operating and drilling oil wells in Canada during 1933 amounted to \$36,972,528. Employment was furnished by this industry to 718 salaried employees and wage-earners, who received \$773,734. Fuel and electricity used during the year accounted for an expenditure of \$136,278.

Table 191.—Production of Crude Petroleum in Canada, by Provinces, 1924-1933

(For the years 1881 to 1923 see Mineral Production of Canada, 1928.)

(Barrel=35 Imp. gal.)

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$		\$		\$
1924.....	5,561	21,313	154,368	441,952	844	4,135	.....	.....	160,773	467,400
1925.....	5,376	18,756	143,134	386,555	183,491	845,394	.....	.....	332,001	1,250,765
1926.....	10,544	29,940	137,850	379,221	216,050	902,504	.....	.....	364,444	1,311,665
1927.....	18,244	41,748	139,606	288,347	318,741	1,185,948	.....	.....	476,591	1,516,043
1928.....	8,043	21,391	134,094	249,737	482,047	1,764,172	.....	.....	624,184	2,035,360
1929.....	7,499	19,909	121,194	253,678	988,675	3,458,177	.....	.....	1,117,368	3,731,764
1930.....	6,758	17,378	117,302	235,746	1,398,160	4,780,696	.....	.....	1,522,220	5,033,820
1931.....	6,577	15,461	122,365	219,993	1,413,631	3,976,220	.....	.....	1,542,573	4,211,674
1932.....	6,408	14,332	130,343	247,468	906,751	2,751,541	910	9,251	1,044,412	3,022,592
1933.....	8,835	18,111	136,058	253,486	995,832	2,844,157	4,608	23,037	1,145,333	3,138,791

¹ From a report by Col. R. B. Harkness, Commissioner of Gas for Ontario.

Table 192.—Production of Crude Petroleum in Canada, by Provinces, 1932 and 1933

Provinces	1932		1933	
	Barrels	Total value	Barrels	Total value
		\$		\$
NEW BRUNSWICK.....	6,408	14,332	8,835	18,111
ONTARIO—				
Petrolia and Enniskillen.....	58,871	110,390	57,298	106,527
Oil Springs.....	31,438	62,057	31,343	61,396
Moore Township.....	3,272	6,132	2,192	4,075
Sarnia Township.....	1,227	2,299	2,181	4,054
Plympton Township.....	274	513	211	392
Bothwell.....	19,460	36,467	22,935	42,633
West Dover.....	453	849	763	1,334
Onondaga.....	543	1,018	946	1,798
Mosa Township.....	8,429	15,795	8,168	15,183
Thamesville.....	534	1,001	847	1,574
Dawn.....	5,061	9,484	8,079	12,634
Raleigh.....			239	444
Euphemia.....	496	929	510	799
Dunwich.....	285	534	346	643
Total for Ontario.....	130,343	247,468	136,058	253,486
ALBERTA—				
Turner Valley.....	868,812	2,713,146	968,055	2,816,061
Red Coulee-Border-Keho.....	33,256	34,228	23,305	23,747
Wainwright-Ribstone.....	4,683	4,167	4,472	4,349
Total for Alberta.....	906,751	2,751,541	995,832	2,844,157
NORTHWEST TERRITORIES.....	910	9,251	4,608	23,037
Canada.....	1,044,412	3,022,592	1,145,333	3,138,791

Table 193.—Petroleum Wells in Canada, by Provinces, 1931, 1932 and 1933

		New Brunswick	Ontario	Alberta	Canada
Productive wells at beginning of year.....	1931	26	2,150	89	2,265
	1932	26	2,208	109	2,343
	1933	23	2,036	111	2,170
Number of productive wells drilled.....	1931	1	1	19	20
	1932	7	7	19	14
	1933	5	5	5	10
Number of wells abandoned.....	1931	66			66
	1932	159	1		160
	1933	237	2		239
Number of dry wells drilled.....	1931	8	11		19
	1932	14			14
	1933	3	1		4
Number of productive wells in operation at end of year.....	1931	26	2,208	109	2,343
	1932	23	2,036	111	2,170
	1933	23	2,151	113	2,287

Table 194.—Imports into Canada and Exports of Petroleum, Asphalt and their Products, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
IMPORTS—		\$		\$		\$
ASPHALT AND ITS PRODUCTS:						
Asphaltum, or asphalt, solid..... tons	36,901	517,532	12,532	193,912	4,462	106,586
Asphalt, not solid.....		35,854		10,709		10,312
Asphaltum oil for paving purposes.....		45,557		8,887		1,458
CRUDE PETROLEUM, FUEL AND GAS OILS						
Crude petroleum in its natural state, .7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories..... gals.	1,017,388,091	22,670,225	889,838,742	26,310,278	954,392,366	20,290,580
Crude petroleum, gas oils other than naphtha, benzine and gasoline lighter than .8235 but not less than .775 specific gravity at 60 degrees..... gals.	77,280	3,221	306,975	13,837	60,331	3,773

Table 194.—Imports into Canada and Exports of Petroleum, Asphalt and their Products, 1931-1933—Concluded

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
IMPORTS—(Concluded)		\$		\$		\$
Petroleum, crude, not in its natural state, .725 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories..... gals.	3,296,711	161,228	20,061,147	1,021,485	25,636,911	1,031,971
Petroleum (not including crude petroleum imported to be refined or illuminating or lubricating oils) -8235 specific gravity or heavier at 60 degrees temperature (fuel oil)..... gals.	53,550,063	1,760,513	57,292,849	2,062,912	43,271,325	1,445,467
Petroleum, and other oils, imported by miners or mining companies or concerns for use in the concentration of ores of metals in their own concentrating establishments..... gals.	127,830	59,426	116,987	58,400	95,421	47,948
Fuel oil, ex-warehoused for ships' stores..... gals.	35,900,828	891,962	32,008,998	857,490	26,896,996	723,863
KEROSENE AND ILLUMINATING OILS						
Coal oil and kerosene, lighter than -8235 specific gravity at 60 degrees temperature, n.o.p..... gals.	3,493,849	212,420	1,670,205	126,768	1,569,384	116,657
Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon..... gals.	11,143	7,322	2,117	890	3,658	1,585
Engine distillate, lighter than -8235 specific gravity at 60 degrees temperature..... gals.	172,588	15,246	63,842	6,843	64,626	6,880
LUBRICATING OILS						
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon..... gals.	9,319,547	1,591,795	7,849,532	1,460,204	6,208,152	1,160,093
Lubricating oils, n.o.p..... gals.	4,481,448	1,983,060	3,753,387	1,567,818	3,660,582	1,464,241
GASOLINE AND OTHER OILS						
Gasoline, .725 specific gravity and heavier, but not heavier than .770 specific gravity at 60 degrees temperature..... gals.	†8,610	821				
Natural casinghead compression or absorption gasoline, lighter than .6690 specific gravity at 60 degrees temperature, when imported by distillers of petroleum for blending with other gasoline distilled in Canada..... gals.	32,140,805	2,152,102	26,693,969	1,530,657	39,688,271	2,545,302
Gasoline, n.o.p..... gals.	†11,320,270	1,147,897				
Gasoline lighter than -8235 specific gravity at 60 degrees temperature..... gals.	* 73,243,020	6,372,346	74,859,806	7,503,705	17,122,366	1,446,766
All other oils, n.o.p..... gals.	578,535	127,343	229,589	80,093	305,985	90,768
OTHER PRODUCTS OF PETROLEUM						
Grease, axle..... lb.	4,148,459	206,770	3,148,868	169,484	2,417,038	130,792
Paraffine wax..... lb.	2,473,199	74,561	1,619,905	53,508	1,760,621	60,955
Paraffine wax candles..... lb.	429,976	79,437	309,486	58,204	165,491	32,174
Vaseline and all similar preparations of petroleum for toilet, medicinal or other purposes.....		186,290		200,084		214,539
Naphtha and products of petroleum, n.o.p., lighter than -8235 specific gravity at 60 degrees temperature..... gals.	3,443,531	329,867	1,884,315	176,702	1,244,930	113,627
Total		40,632,795		43,472,870		31,046,337
EXPORTS—						
Oil, petroleum, crude..... gals.	16,277,182	677,378	7,297,332	244,613	10,658,848	394,727
Oil, coal and kerosene, refined..... gals.	504,364	52,328	884,623	116,897	996,468	179,986
Oil, gasoline and naphtha..... gals.	5,800,606	889,827	4,209,436	585,790	4,042,959	627,851
Oil, mineral, n.o.p..... gals.	885,122	185,177	7,922,816	276,015	12,938,982	537,776
Wax, mineral..... cwt.	9,469	31,092	23,855	66,144	2,498	6,955
Total		1,835,592		1,239,459		1,747,295

* From April 1 to December 31, 1931.

† From January 1 to March 31, 1931.

Table 195.—World Production of Crude Petroleum

(Supplied by Imperial Institute)

(Long tons)

	1931	1932	1933
BRITISH EMPIRE			
United Kingdom (estimated) (c).....	143,000	119,000	118,000
Canada (b).....	195,262	132,204	145,432
Barbados.....	1,131	596	574
Trinidad (b).....	1,334,726	1,387,132	1,309,775
British Borneo (Sarawak).....	520,395	335,287	321,299
Brunei (exports).....	4,326	176,275	280,523
India (b).....	1,177,679	1,191,529	1,181,502
New Zealand.....	455	931	693
Australia (Victoria).....	80	80	80
Total.....	3,380,000	3,340,000	3,360,000
FOREIGN COUNTRIES			
Austria.....		118	842
Czechoslovakia.....	19,424	18,201	17,495
Estonia (c).....	15,316	36,017	37,617
France.....	73,018	83,612	88,654
Germany.....	225,315	226,107	234,819
Greece.....	500	500	(a)
Italy (c).....	18,373	28,100	26,107
Jugoslavia.....	199	284	498
Poland.....	620,526	547,700	545,000
Roumania.....	6,649,352	7,232,264	7,259,129
Russia.....	21,971,100	21,038,200	21,287,000
Spain (c).....	5,608	5,846	(a)
Algeria.....	1,063	877	551
Egypt.....	284,848	266,515	233,970
Morocco (French).....	207	266	552
Cuba.....	1,700	(a)	(a)
Mexico (b).....	5,005,887	4,970,530	5,151,641
United States (b).....	115,010,900	106,102,600	122,385,900
Argentina (d).....	1,646,048	1,847,153	1,924,731
Bolivia.....	3,600	6,300	(a)
Colombia (b).....	2,568,265	2,312,002	1,852,700
Ecuador.....	246,937	280,058	231,415
Peru.....	1,394,321	1,381,820	1,837,673
Venezuela.....	16,920,356	16,815,380	17,000,531
China (c).....	378	327	313
Formosa.....	7,552	16,337	(a)
Iraq.....	118,374	113,000	113,000
Japan.....	266,900	221,282	196,922
"Manchoukuo".....	65,106	74,317	87,078
Netherlands East Indies.....	4,623,851	5,012,725	5,440,155
Persia.....	6,338,444	6,445,808	7,086,706
Total.....	184,100,000	175,000,000	193,000,000
World's Total.....	187,500,000	178,300,000	196,400,000

(a) Information not available.

(b) The following conversion rates have been used: 35 gallons=1 barrel and the undermentioned barrels=1 ton:—Canada 7·9, Mexico 6·6, Trinidad 7·3, India 7·4, United States 7·4, Colombia 7·1, Japan 7·2.

(c) Including shale oil.

(d) Converted from cubic metres at rate of 1 cubic metre=·8843 long tons.

Table 196.—Capital Employed in the Petroleum Industry in Canada, by Provinces,* 1932 and 1933

	1932				1933		
	Ontario	Manitoba	Alberta	Canada	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—							
Cost of lands, buildings, plant, machinery and tools.....	1,370,142	20,000	41,698,130	43,088,272	1,291,464	29,728,185	31,019,649
Cost of supplies and stocks on hand.....	4,498		985,211	989,709	8,762	798,045	806,807
Cash, trading and operating accounts and bills receivable.....	2,506		4,488,075	4,490,581	9,774	5,136,298	5,146,072
Total.....	1,377,146	20,000	47,171,416	48,568,562	1,310,000	35,662,528	36,972,528

*Data for New Brunswick included in the "Natural Gas Industry".

Table 197.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,† 1932 and 1933

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1932					\$	\$	\$
Ontario.....	10		163	173	8,485	86,653	95,138
Manitoba and Saskatchewan.....			6	6		8,405	8,405
Alberta.....	94	17	365	476	208,386	464,234	672,620
Canada.....	104	17	534	655	216,871	559,292	776,163
1933							
Ontario.....	12		166	178	13,233	84,530	97,763
Alberta.....	79	20	441	540	181,529	494,442	675,971
Canada.....	91	20	607	718	194,762	578,972	773,734

*See footnote on page 24.

†Data for New Brunswick included in the "Natural Gas Industry".

Table 198.—Casing used in the Petroleum Industry in Alberta, 1932 and 1933

Size	1932		1933		Size	1932		1933	
	Weight	Length	Weight	Length		Weight	Length	Weight	Length
Inches	Pounds	Feet	Pounds	Feet	Inches	Pounds	Feet	Pounds	Feet
3.....	4,863	1,186			10.....			113,750	2,500
4.....			22,400	1,400	10½.....	32,737	727		
4½.....	6,257	927			11.....	12,300	246		
5.....	9,890	1,153			11½.....	117,430	1,957	5,400	100
5½.....	4,550	435			12.....			154,602	2,845
6.....	1,489	68			12½.....			93,405	1,437
6½.....	1,337	107			13.....			26,250	350
6¾.....	374,178	13,770	201,024	5,584	13½.....			42,875	490
8.....	102,780	2,855	300,770	8,790	14.....			7,400	100
8½.....			180,288	5,008					
8¾.....			304,754	8,333	Total....	984,290	32,318	1,452,918	36,937

2. The Petroleum Products Industry in Canada

Thirty-seven refineries, with a total daily capacity of 149,775 barrels of crude oil, were engaged in petroleum refining in Canada during 1933. These plants are located at strategic points across the Dominion for convenience in marketing their products. In 1932 there were 24 refineries, with a daily capacity of 135,850 barrels of crude oil, operating in Canada.

In 1933, Canadian refineries treated 32.4 million gallons of oil from Canadian wells (including naphtha from the Turner Valley field in Alberta), 688.9 million gallons from the United States, 300.3 million gallons from South America, and 22.6 million gallons from Trinidad and Russia. Gasoline production in Canada totalled 422.9 million gallons, consisting of 267.1 million gallons of straight run and 155.8 million gallons by cracking. The Turner Valley naphtha and natural gasoline which were used in the refineries for blending purposes or charged to the stills are included in these figures, but the imported casinghead gasoline used by the refineries is omitted, as the import data show separate details for casinghead gasoline, part of which is used by the refiners and part by other distributors.

Fuel oil production amounted to 338.5 million gallons of which 55.9 million gallons were used for fuel by the reporting refineries. Refinery stocks of fuel oil were 8.2 million gallons higher than at the end of 1932. The output of gas oils totalled 91.8 million gallons in 1933.

Kerosene production was recorded at 49 million gallons or 6.7 per cent below the 1932 total. Stocks on hand at the refineries increased 7.2 million gallons.

Ten firms were engaged primarily in the compounding of lubricating oils and greases in Canada during 1933. These plants produced lubricating oils, lubricating greases, etc., valued at \$464,544 as compared with the preceding year's valuation of \$337,433.

Capital employed in the Canadian petroleum refining and lubricating oil compounding industries in 1933 totalled \$68,193,854. Employment was furnished on the average to 4,628 employees, who received \$6,141,945. Materials used during the year were valued at \$49,187,757

Table 199.—Materials Used and Products Made by the Oil Refineries of Canada, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
MATERIALS USED—		\$		\$		\$
<i>Petroleum refining—</i>						
Crude oil, product of Canadian wells..... imp. gal.	49,668,529	4,234,481	37,340,321	3,233,136	32,404,139	2,774,379
Crude oil, imported..... imp. gal.	1,025,119,509	43,094,937	892,773,734	45,494,788	1,011,806,711	42,565,519
Sulphuric acid (66° Bé, not made by firm reporting)..... lb.	31,160,023	315,490	26,653,976	266,403	24,057,138	239,016
Sulphur (not used in acid manufacture)..... lb.	126,186	4,278	62,244	2,425	67,730	2,464
Caustic soda..... lb.	4,358,920	144,191	3,079,914	99,852	3,291,438	104,992
Soda ash..... lb.	331,713	7,602	323,840	6,870	284,761	6,483
Litharge..... lb.	257,371	20,164	588,499	27,415	364,934	23,536
Fullers' earth..... lb.	16,157,582	201,361	19,642,179	258,934	22,811,655	314,515
Compounding materials..... imp. gal.		386,342		424,729		372,020
Tetraethyl fluid.....		134,791		408,615		1,451,453
Other materials.....						113,419
Shipping containers.....		1,809,786		1,806,304		949,170
Total.....		50,353,423		52,029,471		48,916,966
<i>Lubricating oils and greases—Total</i>		<i>264,319</i>		<i>207,916</i>		<i>270,791</i>
Grand total.....		50,617,742		52,237,387		49,187,757
PRODUCTS MADE—						
<i>Petroleum refining—</i>						
Made for sale—						
Gasoline (a) straight run..... imp. gal.	278,215,832	29,876,513	207,750,871	23,148,720	267,010,338	25,933,516
(b) by cracking process..... imp. gal.	191,632,502	20,224,691	192,113,405	19,957,260	155,843,903	13,911,439
Fuel oil..... imp. gal.					282,580,908	9,617,675
Gas oils..... imp. gal.	374,201,530	12,400,027	312,814,635	11,262,147	91,390,183	4,712,675
V.M. & P. or solvent naphtha..... imp. gal.	8,468,995	769,201	18,075,192	2,043,823	33,947,241	2,987,440
Kerosene..... imp. gal.	39,421,314	4,125,272	52,466,990	5,141,901	48,951,129	4,455,425
Lubricating oils..... imp. gal.	15,157,065	2,548,923	15,105,061	3,656,856	17,194,703	2,983,331
Grease..... lb.	9,390,866	187,216	9,629,492	531,759	8,339,991	357,205
Tar..... lb.	902,000	9,020				
Asphalt..... imp. gal.	37,937,082	1,836,403	23,082,228	1,934,046	21,627,760	1,698,023
Petroleum coke..... tons	52,310	280,660	53,787	293,755	54,646	322,379
Wax and candles..... lb.	10,097,369	368,677	9,195,542	417,304	8,997,682	355,308
Other products.....		186,963		176,402		4,350
Total for sale.....		72,813,566		68,563,973		67,338,766
Made for own use—						
Gasoline (a) straight run..... imp. gal.	77,041	8,039	72,402	7,472	75,892	6,940
(b) by cracking process..... imp. gal.	54,551,901	1,640,400	53,459,252	1,787,253	55,884,197	743
Fuel oil (except for cracking)..... imp. gal.					458,804	1,611,981
Gas oils..... imp. gal.	22,462	2,252	106,435	9,985	71,914	25,981
V.M. & P. or solvent naphtha..... imp. gal.	44,245	4,810	58,067	5,406	77,200	5,611
Kerosene..... imp. gal.	54,823	8,852	38,842	9,380	54,957	6,188
Lubricating oils..... imp. gal.					4,855	8,731
Grease..... lb.					18,420	255
Asphalt..... imp. gal.					20,079	1,496
Petroleum coke..... tons	20,029	96,676	19,278	104,181	20,079	115,400
Still gas..... M cu ft.	5,161,905	980,628	3,836,413	824,386	3,505,405	631,116
Wax and candles..... lb.					386	15
Other products.....		33,202		48,288		50,498
Total for own use.....		2,774,859		2,796,351		2,464,955
Total Petroleum refining.....		75,588,425		71,360,324		69,803,721
Fuel and gas oils made and used in pressure cracking process..... imp. gal.	441,297,994		355,368,388		364,389,832	
<i>Lubricating oils and greases—</i>						
Lubricating oils..... imp. gal.	749,333	477,131	462,888	242,196	576,560	311,767
Lubricating greases..... lb.	537,655	56,547	260,853	34,811	896,755	112,656
Soaps and soap powders..... lb.	308,690	27,283	290,955	29,092	310,996	30,386
Other products.....		9,258		31,334		9,735
Total lubricating oils and greases.....		570,219		337,433		464,544
Grand total.....		76,158,644		71,697,757		70,268,265

CHAPTER EIGHT

THE NON-METAL MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Abrasives	Miscellaneous—	Manganese bog
Asbestos	Actinolite	Mineral waters (natural)
Feldspar and Quartz	Barytes	Natro-alunite
Gypsum	Bituminous sands	Phosphate
Iron oxides (ochre)	Fluorspar	Pyrites
Mica	Graphite	Silica brick
Salt	Lithium minerals	Sodium carbonate
Talc and soapstone	Magnesitic dolomite	Sodium sulphate
	Magnesium sulphate	

THE ABRASIVES INDUSTRY IN CANADA

The abrasives industry in Canada includes two main divisions: (1) The Natural Abrasives Industry, covering the production of natural abrasives such as grindstones, pulpstones and scythestones, corundum, diatomite, volcanic dust, etc., and (2) The Artificial Abrasives and Abrasive Products Industry, which covers the manufacture of silicon carbide, fused alumina, abrasive wheels, abrasive paper, etc.

(1) ABRASIVES, NATURAL

Corundum.—Corundum crystals are found in an area embracing several townships in Renfrew and Hastings counties in the province of Ontario. The corundum mining industry made its appearance in this area in 1900 and production reached a maximum in 1906. Corundum mining practically ceased with the perfection and production of artificial abrasives by the electric furnace. In 1921 grain corundum amounting to 403 tons valued at \$55,965 was exported to the United States; since that time no shipments of corundum have been reported.

For some years the principal sources of supply have been, and still are, the Zoutpansberg and Pietersberg districts of Northern Transvaal, South Africa. The mineral occurs in these areas largely as loose crystals in a disintegrated corundum-bearing rock. In 1933 the South African shipments of corundum totalled 1,303.8 tons valued at £9,531 as compared with an output of 361.8 tons worth £2,621 in 1932.

About one-half of the corundum mined is used normally in the manufacture of abrasive wheels. The lens and optical grinding trades also consume a considerable percentage in the form of flour or fine grains.

The higher grades of emery, a mixture of magnetite and corundum, come largely from Asiatic Turkey and Greece; emery powder is utilized largely in the surfacing of plate glass and in the manufacture of abrasive cloths and grinding compounds.

No imports or exports of corundum were reported in Canada during either 1932 or 1933; imports of crude corundum into the United States in 1932 amounted to 168 tons valued at \$8,258.

Emery prices were quoted in the United States at the close of the year as follows:—per ton, f.o.b. New York, domestic crude ore, first grade, \$10; other American ore delivered to grinders, per gross ton, \$16; Turkish and Naxos ore, \$30 to \$35. F.O.B. Pennsylvania, in 350 pound kegs, Turkish, Khasia and Naxos grain emery, 6½ cents per pound; American, 4 cents.

Diatomite.—Production of diatomaceous earth in Canada during 1933 totalled 1,789 tons valued at \$36,648 compared with an output of 1,496 tons at \$29,509 in 1932. The material in 1933 came from the provinces of Nova Scotia, Ontario and British Columbia. In Nova Scotia, International Diatomite Industries Limited operate two plants, one at New Annan, Colchester county, and the other near Little River village on Digby Neck. Both plants worked continuously during 1933; the Little River plant was remodelled by making an addition to the length of the rotary kiln preparatory to removing part of the moisture from the crude material before klin treatment. It was reported that a new market exists in England for this company's products and that shipments might commence to Europe sometime in 1934.

The Department of Mines, Ottawa, reports that there was considerable activity in the Muskoka region of Ontario. Diatomite Products Limited completed its large plant which is equipped with a vertical 8-hearth furnace, air flotation system, filter, etc. This company made a trial shipment of the processed diatomite obtained from the Slocombe Lake mud. The Dominion Diatomite Company made some alterations in the mill near Novar and small shipments of diatomite were made to Toronto.

The B.C. Refractories Limited continued operations and shipped a few cars of diatomite to their Vancouver plant from Quesnel in the Cariboo district, British Columbia, where the largest known deposits in the Dominion occur.

V. L. Eardley-Wilmot of the Department of Mines, Ottawa, states that deposits containing diatomite (minute silicious skeletons of aquatic plants of marine or fresh water origin) are very common in some parts of Canada, particularly in the Muskoka district of Ontario and in Nova Scotia. When properly prepared the best quality Canadian diatomite can, for any of its varied uses, hold its own against the imported material from any source.

The demand for battery box diatomite has increased and diatomite as a filter-aid for use in large cleaning establishments is becoming popular. Some companies in Toronto and vicinity are manufacturing diatomite insulating bricks and insulating pads, while other firms are contemplating in the near future the manufacture of diatomite insulation, refractory and building products. The largest individual use for diatomite in Canada is as a filter-aid in sugar refineries.

The original particles of diatomite, owing to their fragile structure, break down easily under pressure and for this reason the material is suitable for fine metal polishes, buffing compounds and tooth paste, where a mild but hard abrasive is required.

The price for diatomite in Canada varies from \$25 to \$35 per ton for concrete admixture; \$35 to \$75 for insulation and filtration; up to \$200 in small lots for material suitable for polishes; imported insulation brick vary from \$110 to \$140 per 1,000, according to grade and density.

Tripoli is a form of silica which closely resembles diatomite but is of entirely different origin, being generally regarded as a chalcedonic variety of silica; no production of this mineral is reported in Canada. It is used to a considerable extent as a mechanical cleanser, in admixture with soap and other detergents; it is also employed interchangeably with pulverized silica for use as a filler or inert extender in paints and transparent wood fillers. The material is usually sold by sample the governing factors being the quantity of free quartz grains or "grit", colour and fineness.

Table 200.—World Production of Diatomaceous Earth, 1931, 1932 and 1933

(From the Imperial Institute's publication "The Mineral Industry of the British Empire and Foreign Countries")

(Long tons)

Producing country	1931	1932	1933
BRITISH EMPIRE			
Northern Ireland.....	3,401	3,731	3,998
Canada.....	1,437	1,336	1,597
Barbados.....	10	10	10
Australia.....	1,067	1,484	2,849
FOREIGN COUNTRIES			
Denmark (moler) (estimated).....	34,000	29,000	21,000
France.....	10,600	9,000	3,000
Germany (exports).....	4,908	3,945	4,483
Hungary (exports).....	1,892	1,017	1,246
Italy.....	857	758	1,919
Norway (exports).....	84	113	221
Netherlands East Indies.....	80	40	(a)
Spain (estimated).....	2,200	2,200	3,300
Sweden.....	621	702	640
Algeria.....	10,984	10,285	10,826
Mexico.....	3		
United States.....	(c) 73,891	(a) 73,891	(b) 80,300
Chile.....	100	(a)	(a)
Japan.....	6,701	7,032	14,371
Korea.....	700	1,761	2,994

NOTE.—12,027 long tons of Diatomaceous earth were recorded as produced in U.S.S.R. (Russia) during year ended September, 1928—later figures are not available.

(a) Information not available.

(b) Estimated.

(c) Annual average of 3 years' production, 1930-1932.

Garnets.—There has been no commercial production of garnets in Canada during recent years. In 1933 some prospecting work was conducted on garnet deposits occurring in the vicinity of Labelle, Quebec, and northwest of North Bay, Ontario; small trial shipments of the mineral were made from both areas during the year. According to the Department of Mines, Ottawa, about 85 per cent of the world's garnet production is used for making abrasive coated papers and cloths and almost all the balance for glass surfacing. During recent years the artificial abrasive coated papers have increasingly made inroads into the garnet paper production.

Owing to the relatively small demand for garnet and because of the large potential supply in the United States, only the highest quality Canadian abrasive garnet deposits with good transportation facilities should be considered. Garnets for industrial purposes should be clear, deep red, walnut or larger in size and should break into sharp and angular grains free of embedded impurities.

It is estimated that the normal consumption of garnet in Canada amounts to approximately 65 tons per year.

Garnet was quoted in the United States, September, 1934, as follows:—per ton, f.o.b. New Hampshire mines, concentrate, \$30; grain, \$80 to \$140. New York, Adirondack garnet concentrates, \$85. Spanish grades, \$60, c.i.f. port of entry.

Grinding Pebbles.—No shipments from Canadian deposits of pebbles, suitable for use as grinding material, have been reported since 1926; during that year 64 tons were produced from deposits occurring on the north shore of Lake Superior near Jackfish, Ontario. Pebbles are now cut in the United States from solid blocks of quartzite and later rounded smooth in tube mills; this product is claimed to last longer and is superior to the imported Danish pebbles.

The Mines Branch, Ottawa, reports that a considerable deposit of pebbles suitable for grinding purposes occurs on the north shore of Gabarus Bay, Cape Breton county, Nova Scotia.

Grindstones, Pulpstones and Sharpening Stones.—Shipments of grindstones, pulpstones and scythestones from Canadian quarries in 1933 amounted to 499 tons valued at \$21,919 as compared with 328 tons at \$15,735 in 1932, an increase of 36.9 per cent in quantity and 39.3 per cent in value.

In Eastern Canada shipments of abrasive stones were made from Stonehaven and Woodpoint, New Brunswick, and from Quarry Island, Pictou county, Nova Scotia. The balance of the Canadian production in 1933 comprised shipments of pulpstones fabricated from stone quarried on Newcastle Island, opposite Nanaimo, British Columbia.

The demand for all but the largest sized grindstones is very limited, owing to the increasing use of artificial stones and to foreign competition. The price of Canadian grindstones is \$44 per ton and about \$66 per ton for pulpstones. The stones for the modern pulpmills are now mainly of the large magazine type. The new artificial pulpstone made of silica carbide segments is gradually but surely replacing the natural stone. (Mines Branch Report No. 673.)

Consumption of pulpstones by the Canadian pulp and paper industry, 1931-1933, was as follows:—

	1931		1932		1933	
	Number	Value	Number	Value	Number	Value
		\$		\$		\$
For 2 foot wood.....	226	72,588	210	65,450	321	98,475
For 2-5 foot wood.....	225	71,760	139	46,436	95	31,945
For 4 foot wood.....	285	337,580	222	249,373	199	223,635

Volcanic Dust (Pumicite).—No volcanic dust was mined in Canada in 1933, although 118 tons valued at \$2,360 were reported as being shipped in Saskatchewan, the material coming from the deposits located near Swift Current.

Volcanic dust beds up to 30 feet thick and situated near Waldeck, a few miles east of Swift Current, Saskatchewan, have, for the past few years, been worked by the Van Kel Cleansers Ltd.; the product has been successfully used as a cold water calcimine, as a cleanser, as a glass and metal polish, as a hand cleanser, and as a sweeping compound. Some producers of lump pumice, mainly in California, are successfully utilizing their fines, particularly in cement and acoustic plasters. The University of Saskatchewan has been experimenting with volcanic dust as a ceramic glaze and results so far have been very successful.

Powdered pumice stone in barrels was quoted September, 1934, at 2½ to 4½ cents per pound f.o.b. New York or Chicago; lump, 5 to 7½ cents.

Table 201.—Capital Employed in the Natural Abrasives Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
Capital employed as represented by:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	605,436	31,991
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	1,280	1,274
(c) Inventory value of finished products on hand.....	15,394	8,710
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	57,755	16,581
Total.....	679,865	58,556

Table 202.—Employees, Salaries and Wages in the Natural Abrasives Industry in Canada, 1932 and 1933

	1932				1933			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	7	2	9	11,671	1		1	1,500
Wage earners.....	27		27	14,800	18		18	6,296
Total.....	34	2	36	26,471	19		19	7,796

Table 203.—Production of Diatomite in Canada, 1924-1933

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	33	838	1930.....	554	13,247
1925-1926.....			1931.....	1,610	32,789
1927.....	266	6,650	1932.....	1,496	29,509
1928.....	368	8,960	1933.....	1,789	36,648
1929.....	429	10,330			

NOTE.—For years 1896 to 1923, see previous reports.

Table 204.—Production of Grindstones in Canada, by Provinces, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1924.....	338	12,525	1,693	56,586	2,031	69,111
1925.....	439	16,723	1,296	45,061	1,735	61,784
1926.....	311	15,136	1,202	43,850	1,513	58,986
1927.....	11	220	1,306	47,255	1,317	47,475
1928.....			1,250	45,901	1,259	45,901
1929.....	6	110	1,032	37,291	1,035	37,401
1930.....	6	110	229	9,764	235	9,874
1931.....			198	8,164	198	8,164
1932.....	12	433	188	8,903	200	9,336
1933.....	21	868	140	6,211	161	7,079

Table 205.—Production of Pulpstones and Sharpening Stones in Canada, 1924-1933

Year	Pulpstones		Sharpening stones		Year	Pulpstones		Sharpening stones	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1924.....	624	58,113	36	3,600	1929.....	754	62,336	155	6,617
1925.....	781	57,781	46	4,600	1930.....	573	49,897	22	2,250
1926.....	1,155	89,541	27	2,700	1931.....	342	27,305	81	2,634
1927.....	911	75,242	23	2,300	1932.....	60	3,500	68	2,899
1928.....	581	52,659	24	2,400	1933.....	214	9,870	123	4,970

Table 205(a).—Production of Grindstones, Pulpstones and Sharpening Stones in Canada, by Provinces, 1931-1933

Province	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Nova Scotia.....			12	493	21	868
New Brunswick.....	299	12,308	256	11,802	277	12,051
British Columbia.....	322	25,795	60	3,500	200	9,000
Total	621	38,103	328	15,735	498	21,919

Table 206.—Imports into Canada and Exports of Abrasives, 1931-1933

Item	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
IMPORTS—						
Abrasives—						
Artificial abrasive grains, crushed or ground, when imported for use in Canadian manufactures.....		184,280		154,419		194,618
Diamond dust or bort, and black diamonds for borers.....		450,148		129,703		354,999
Diatomaceous earth or infusorial earth (Kieselguhr) ground or unground cwt.	17,000	25,788	2,009	2,944	44,120	71,166
Emery in bulk, crushed or ground.....		26,280		31,252		26,371
Grinding wheels, manufactured by bonding together of either natural or artificial abrasives.....		125,673		132,373		47,965
Grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives.....		28,969		30,010		5,141
Grindstones, not mounted, and not less than 36 inches in diameter.....		111,770		83,896		76,615
Grindstones, n.o.p.....		7,228		3,587		2,516
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		34,542		22,391		18,113
Sand paper, glass, flint and emery paper or cloth.....		201,277		91,485		81,559
Iron sand or globules or iron shot, and dry putty, for use in polishing glass or granite, or for sawing stone.....		25,319		8,142		7,063
Manufactures of emery or of artificial abrasives, n.o.p.....		44,429		38,778		24,717
Burrstones in blocks, rough or unmanufactured, not bound up or prepared for binding into mill-stones..... No.			10	927	6	260
Total		1,265,703		729,907		911,103
EXPORTS—						
Grindstones, manufactured.....		10,776		7,541		2,840
Abrasives—						
Natural, n.o.p., in ore or bulk..... cwt.	14,372	14,185	22,419	27,169	36,096	43,906
Artificial, crude, including carborundum..... cwt.	851,206	1,981,713	246,177	953,422	628,958	2,121,681
Artificial, made up into wheels, stones, etc.....		19,576		24,221		35,933
Total		2,026,250		1,012,353		2,204,360

2. ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS

In 1933 the value of output by firms which made artificial abrasives and abrasive products was \$3,550,456 compared with \$1,489,555 in 1932 and \$4,857,914 in 1931. The same 14 plants were in operation as in 1932 but the number of employees increased to 572 from 386 and disbursements for salaries and wages to \$705,729 from \$519,013. The cost of materials for manufacturing was \$1,338,879 in 1933 compared with \$449,624 in the previous year and the amount paid for fuel and electricity was \$481,152 as against \$480,601 in 1932. Capital employed was reported to be slightly lower in 1933 at \$5,176,927 as against \$5,865,031 in the preceding year.

Artificial abrasives were made in 6 plants located near the power centres of Niagara Falls and Shawinigan Falls; fused alumina was made in 5 works and silicon carbide in 3 establishments. Output totalled 28,854 tons at \$2,491,383 in 1933 compared with 9,822 tons at \$697,033 in 1932. Corresponding figures for earlier years were: 1931—46,535 tons at \$4,068,019; 1930—65,672 tons at \$5,488,384; 1929—75,449 tons at \$7,551,822. Practically all of the crude abrasives were shipped to parent plants in the United States for crushing, cleaning and grading.

Abrasive wheels were manufactured in 7 factories, all in Ontario. Output of wheels was valued at \$336,647 in 1933 compared with \$293,528 in 1932 and \$347,345 in 1931.

Abrasive cloth and paper were made in two factories in 1933.

ASBESTOS

The principal asbestos of commerce occurs in serpentine. That from Canada, and especially from Quebec mines, is found to be more uniform in requisite commercial qualities and therefore more desirable and valuable than asbestos from most other countries.

Statistics relating to Canadian asbestos production during 1933, reveal a most gratifying improvement in the industry as compared with conditions existing during the previous year. Shipments at 158,367 tons represent an increase of 28.8 per cent over the output for 1932. The value of the 1933 production totalled \$5,211,177 as against \$3,039,721 in 1932 or an increase of 71.4 per cent. The average price for the year was \$32.90 per ton as compared with \$24.72 in 1932 and \$29.29 in 1931. Rock mined in 1933 amounted to 1,566,919 tons or an increase of 36.8 per cent over the tonnage of the preceding year. The first three months of 1933 were very unsatisfactory from an industrial viewpoint. Prices were low and adverse market conditions existed. An upward trend commenced in April with the last quarter of the year showing shipments of 57,313 tons as compared with 16,887 tons made during the first three months. It will be noted in comparing the table of production for 1933 with those in previous reports, that the grades as recorded for publication have been reduced from eight to three; this change will in no way affect the value of totals for comparative purposes.

Production of Canadian asbestos during 1933 came entirely from the Eastern Townships in the province of Quebec. The following brief excerpts, from a paper by J. G. Ross and staff of one of the larger operating companies, are included as being of possible interest to those readers not already familiar with the occurrence and mining of asbestos in Canada.

"The producing mines of the area (Thetford Black Lake) from the Vimy Ridge mine at the southwest to the King mine on the northeast, cover a distance of about seven miles. The productive areas lie within the boundaries of a large mass of serpentinized peridotite which widens out to nearly eight miles at its greatest width. They are roughly aligned, however, within a quarter of a mile to a mile from the northwest contact. Asbestos does not occur closer to the contact and farther within the mass, but in commercial quantities, generally along this line only The asbestos occurs as small veins or as a fibrous development on slip-page planes. Veins range from microscopic widths to four inches and more in thickness, and may have the form of gash veins or be continuous for a hundred feet. They strike and dip at all angles and degrees and may be closely or widely spaced when the fibres of asbestos are roughly normal to the wall of the vein this is called a cross-fibre vein; if in approximately the plane of the vein, it is called slip fibre. Both types of fibre are of the mineral chrysotile—the cross-fibre type is much higher in quality and in commercial value than the slip fibre."

Another important asbestos producing area in the Eastern Townships is located in Shipton township, Richmond county. Various grades of high quality fibre are produced here from serpentine rock mined at the Jeffrey mines. High grade chrysotile asbestos is also mined and milled at East Broughton and Norbestos.

Both surfaces and underground methods are utilized in the mining of Quebec asbestos and the milling practices employed in the recovery of the various high grade fibres are considered among the most efficient employed anywhere in the world.

NOTES ON ASBESTOS RESEARCH BEING DONE AT THE NATIONAL RESEARCH LABORATORIES, OTTAWA

1. **ACTIVE SILICA AND MAGNESIUM SALTS FROM SERPENTINE ROCK.**—Patents have been obtained for a process of manufacturing active silica and salts of magnesium from serpentine rock obtained as waste or tailings from the milling of asbestos-bearing serpentine rock. The active silica has valuable absorptive properties which make it useful industrially and of the salts of magnesium which are obtained by this process the more important are magnesium sulphate or Epsom salts and magnesium chloride.

2. **ASBESTOS CEMENTS.**—A comprehensive study of asbestos cements has been undertaken and considerable data concerning the properties of the various grades being used, has already been obtained.

In this connection the physical composition of milled asbestos, as revealed by mineralogical and microscopic examination, is also being studied. Information obtained in this way may throw further light on the relation between method of treatment and quality of fibre.

3. **MAGNETIC IRON IN ASBESTOS.**—The mode of occurrence of magnetic iron in asbestos is being studied with the view of eliminating this impurity.

4. **MOULDED COMPOSITION FROM ASBESTOS.**—Patents have been obtained on a new method of moulding asbestos products whereby a wide range of physical properties can be obtained.

The specifications for a Standard Testing Machine as developed by the National Research Council and which had been approved last year by the Associate Committee on Asbestos Research, have now been accepted by the asbestos producers; these producers have agreed to bring all their old testing machines up to these specifications by July, 1934. Specifications for standard testing screens as recommended by the National Research Council have also been accepted by the producers.

The National Research Laboratories are making a study with the object of preparing special short grade fibres to be used as fillers for synthetic resins.

New structural uses for asbestos are described in the "Electrical World" as follows:—

"Costing about the same as concrete for its first installation . . . the use of asbestos lumber for bus and switch structures is expected by the company to reduce materially the cost of such structures in succeeding stations. The reduction will be because of the elimination of form work . . . all walls, barriers, horizontal slabs and other parts of the structure are made of asbestos lumber."

"Chemical Age," London, states that the use of asbestos cloth for electrolytic diaphragms is one which is growing very rapidly. In the production of synthetic ammonia, in those locations where cheap electric power is available, the hydrogen is obtained by the electrolysis of water and in these cells asbestos cloth is used as diaphragms to separate the gases. White asbestos cloth is generally used for this purpose and here again the weave of the cloth is of enormous importance; generally speaking a "light tight" cloth must be used. In some types of chlorine-alkali cell an asbestos cloth diaphragm is also used, and in this case blue asbestos cloth has been found to give better results than white asbestos.

Recent press despatches report that Turner & Newall, Ltd., one of the leading firms in the British asbestos industry, has announced the extension of its interest to the United States through the purchase of a controlling interest in the Keasbey & Mattison Company and the Ambler Shingle & Sheathing Co., both of Ambler, Pa.

The "Mining Journal", London, states: "The market for asbestos in 1933 showed a slowly improving tendency for the better qualities of material under the influence of regulated production in British Africa and better organized marketing. The available supplies of asbestos are still large, but the increased demand experienced in the latter months of 1933 helped towards reducing those to normal proportions . . . the prices of asbestos scarcely improved in 1933 and are still considerably below those of a few years ago. On the other hand, prices for most grades have been rather stable for the past two years . . . the higher grades of asbestos marketed (United Kingdom) come chiefly from British South Africa and Russia . . . The current production in Russia is around 60,000 tons annually but the official programme of future production is for

several times that quantity, which suggests that Russian competition in the asbestos market is likely to be strongly felt in the future. An unofficial estimate of the Russian 1933 production is 72,000 tons."

"Iron Age" describes a new asbestos product that is claimed to possess an unusual combination of advantageous chemical and physical properties. It is made by combining a specially selected asbestos base with a phenol-formaldehyde type of resin. The high acid-resisting properties of this resin, combined with the acid resistance of the asbestos provide a material which, it is claimed, is completely acid resistant throughout.

It is reported that a British manufactured asbestos reinforced aluminium foil provides an efficient low priced insulating material which is at once light in weight, convenient to handle and apply, and infinitely durable in performance. It is claimed to be resistant to wind and air infiltration, to water and to dampness and provides insulation more effective than that given by one inch slab cork and the saving in weight, cost, labour and construction is very appreciable.

"Asbestos," Philadelphia, contains the statement that "asbestos mixed with an adhesive liquid has been invented for the spraying of fruit trees when in bud, to protect from frost. It is said this coating will last several months."

An interesting use of asbestos as a filtering medium in the production of South African grape juice is described in "Chemical Age" as follows "The asbestos filtering material is alluviated on to fine wire gauzes, and, in spite of the sharp filtration, an extraordinary output is achieved The grape juice, after decarbonation, is filtered through asbestos filtering films, which are so finely constructed that yeasts and bacteria are completely removed from the liquid."

Table 207.—Capital Employed in the Asbestos Industry in Canada, 1931-1933

	1931	1932	1933
	\$	\$	\$
Capital employed as represented by:			
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	33,657,879	23,620,216	18,127,332
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	1,009,423	789,742	389,714
(c) Inventory value of finished products on hand.....	1,631,891	1,423,282	894,059
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	3,864,812	4,248,122	1,698,862
Total.....	40,164,005	30,081,362	21,109,967

Table 208.—Employees, Salaries and Wages in the Asbestos Industry in Canada, 1932 and 1933

	1932				1933			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
Salaried employees.....	110	26	136	\$ 279,950	118	22	140	\$ 261,684
Wage-earners—								
Mine.....	540		540	659	659		659	
Mill.....	733		733	830	830		830	
Total.....	1,273		1,273	876,365	1,489		1,489	1,017,409
Grand total.....	1,383	26	1,409	1,156,315	1,607	22	1,629	1,279,093

Table 209.—Number of Wage-Earners on Pay Roll in Asbestos Mining Industry, by Months, 1932 and 1933

Month	1932	1933
January.....	1,344	1,218
February.....	1,436	1,048
March.....	1,380	1,016
April.....	1,130	1,119
May.....	1,219	1,399
June.....	1,234	1,392
July.....	1,216	1,543
August.....	1,002	1,564
September.....	1,229	1,920
October.....	1,275	2,059
November.....	1,340	1,819
December.....	1,367	1,754

Table 210.—Sales and Shipments of Canadian Asbestos, 1932-1933

	1932		1933	
	Tons	\$	Tons	\$
Crudes.....	471	119,221	1,306	341,734
Fibres.....	45,323	1,885,841	82,605	3,843,887
Shorts.....	77,183	1,034,659	74,456	1,025,556
Total.....	122,977	3,039,721	158,367	5,211,177
Sand, gravel and stone (waste rock only*).....	3,473	3,369	6,445	3,215

	1932	1933
Quantity of rock mined.....	Tons 1,145,340	Tons 1,566,919
Quantity of rock milled.....	1,029,709	1,329,814
Quantity of tailings retreated.....	709,094	521,930

*This production is included under the sand and gravel industry.

Table 211.—*Production of Asbestos in Canada, 1924-1933

(For the years 1880 to 1923 see Mineral Production of Canada, 1928)

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1924.....	225,744	6,710,830	1929.....	306,055	13,172,581
1925.....	273,524	8,977,546	1930.....	242,114	8,390,163
1926.....	279,403	10,099,423	1931.....	164,296	4,812,886
1927.....	274,778	10,621,013	1932.....	122,977	3,039,721
1928.....	273,033	11,238,360	1933.....	158,367	5,211,177

*Sales.

Table 212.—Imports of Asbestos into Canada, 1931-1933

Item	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Asbestos in any form other than crude, and all manufactures of, n.o.p.....		312,484		226,619		233,966
Asbestos packing.....	69	63,455	55	52,733	79	54,148
Asbestos brake and clutch lining.....		241,880		194,745		165,994
Total.....		617,819		474,097		454,108

Table 213.—Exports of Canadian Asbestos, by Countries of Destination, 1931-1933

Commodity and destination	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
ASBESTOS—						
United Kingdom.....	1,801	140,024	1,420	82,567	4,633	303,492
United States.....	46,002	2,171,000	27,392	1,274,646	48,469	2,324,246
Australia.....	304	20,010	451	24,800	744	39,162
Belgium.....	7,831	533,737	1,080	49,707	5,051	275,046
France.....	3,327	244,380	2,360	150,911	2,620	167,832
Germany.....	4,714	399,584	1,969	117,148	4,572	306,713
Italy.....	1,264	116,359	666	48,162	1,647	94,047
Japan.....	4,539	227,803	6,683	338,576	9,530	422,252
Netherlands.....	977	67,840	421	17,300	1,088	50,333
Spain.....	94	5,080	219	11,323	343	14,976
Other countries.....	50	3,500			4	278
Total.....	70,963	3,929,317	42,661	2,115,140	78,701	3,998,377
SAND AND WASTE—						
United Kingdom.....	1,015	22,492	1,151	25,830	2,816	54,979
United States.....	89,082	1,130,159	65,618	901,927	63,744	869,994
Germany.....	1,568	34,717	733	13,934	1,666	32,222
Netherlands.....	870	21,380	764	18,385	377	7,220
Other countries.....	2,000	36,578	1,503	26,019	1,693	27,002
Total.....	88,535	1,245,326	69,769	986,095	70,296	991,417
ASBESTOS MANUFACTURES, INCLUDING ASBESTOS ROOFING—						
United Kingdom.....		66,078		35,325		37,420
United States.....		10,751		7,212		2,033
Newfoundland.....		13,684		3,985		2,123
Argentina.....		4,863		8,513		5,186
Other countries.....		15,865		20,482		26,280
Total.....		111,241		75,517		73,044

Table 214.—World Production of Asbestos, 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES			
Southern Rhodesia.....	21,466	14,077	26,948	Brazil.....	15		
Swaziland.....		4		Finland (amphibole).....	572	800	(a)
Union of South Africa (b)...	11,480	7,844	15,185	France.....	500	300	(a)
Canada—				Italy.....	571	1,461	(a)
Chrysotile.....	141,470	(c) 112,902	(c) 147,153	U.S.S.R. (Russia).....	63,653	(a)	(a)
Crude.....	2,202	421	1,166	United States (Sales)—			
Spinning fibre.....	10,115	5,361		Amphibole.....	331	3,178	4,237
Shingle fibre.....	9,782	5,915	73,754	Chrysotile.....	2,551		
Paper fibre.....	33,260	29,191		Japan (estimated).....	1,000	1,000	1,000
Waste, slucra or plaster.....	5,650	3,557	66,479	Manchoukuo.....	168	118	104
Refuse or shorts.....	74,024	65,356		Argentina.....		7	(a)
Sand and gravel.....	6,437	3,101	5,754	China (estimated).....	500	500	500
Actinolite.....	31			Greece.....	10	8	(a)
Cyprus.....	1,138	1,520	3,494	Turkey.....	4		118
India.....	6	90		Korea.....			12
Australia.....	122	130	279				
Total.....	176,000	137,000	193,000	Total.....	70,000	(a)	(a)
				World's Total.....	246,000	(a)	(a)

(a) Information not available.

(b) Production is not available by kinds, but sales were as follows:—

	1931	1932	1933
Amosite.....	1,863 long tons	1,242 long tons	2,765 long tons
Blue.....	3,259 "	2,647 "	2,879 "
Chrysotile.....	8,873 "	6,888 "	8,546 "

(c) Sales and shipments.

FELDSPAR AND QUARTZ

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found very difficult for the operator to make a separate division of data pertaining to the mining of each individual mineral and for this reason the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this report.

Feldspar.—The first record of production in the feldspar industry in Canada dates back to about 1890, approximately 700 tons were mined in that year. This was increased until the maximum output of 44,804 tons was reached in 1924.

Production of feldspar in Canada during 1933 totalled 10,658 tons valued at \$105,117 as compared with 7,047 tons worth \$81,982 in 1932 and 18,343 tons at \$186,961 in 1931. The 1933 output represents a gain of 51 per cent in quantity and 28 per cent in value compared with 1932. This increase apparently reflects the stimulated uptrend in general industry, especially in certain branches of the ceramic trade, and it is encouraging to note that the improvement commenced in 1933 has extended into 1934 as evidenced by an increase of 85 per cent in the tonnage of feldspar shipments during the first six months of the current year as compared with the corresponding period of 1933.

Canadian production of feldspar both in 1933 and the first half of 1934 came entirely from the provinces of Quebec, Ontario and Manitoba. It is noteworthy that prior to 1933 the commercial output of feldspar was confined only to Quebec and Ontario with the exception of the year 1921 when a relatively small tonnage was shipped in Nova Scotia. Commencing in 1933 feldspar was recorded as being mined and sold on a commercial basis for the first time in Manitoba.

Most of the feldspar mined in Canada is of the high-potash variety. Deposits of soda-rich spar are relatively uncommon and often carry a high proportion of objectionable impurities. Until a couple of years ago, there was a small production of high-soda spar from a deposit in Aylwin township, Quebec, the material being used in scouring-soap compounds, this mine was closed down in 1931. A proportion of the best grade feldspar mined in the Buckingham district, Quebec, is utilized for dental purposes.

In Quebec the mineral was mined and shipped in the townships of Derry, Buckingham, Portland and Villeneuve de Papineau county. The grinding plant of the Canadian Flint and Spar Co., Ltd., located at Buckingham, was in operation throughout the year, these works are equipped to produce a wide range of pulverized feldspars.

The greater part of the feldspar shipped in Ontario during 1933 was mined in Bathurst township, Lanark county; other important shipments were made from Hybla in the Bancroft area and from Britt in the Parry Sound district. At Kingston the Fronenac Floor and Wall Tile Co., Ltd. ground and marketed feldspar for consumption in the ceramic and glass industries; ground feldspar was also utilized by this firm in the manufacture of tile.

During 1933 several tons of nepheline syenite bearing rock were mined and shipped in Methuen township, Peterborough county; this production was exported for treatment in the United States. The product made there was submitted to the glass trade and various ceramic laboratories in the United States, Canada and Great Britain for report as to the suitability of the material for ceramic purposes. Reports are stated to have been entirely favourable and the Department of Mines, Ottawa, reports that if the projected development of the industry materializes it may result in the substitution of this product for considerable tonnages of feldspar.

In Manitoba, the Winnipeg River Tin Mines, Ltd., conducted feldspar mining operations during 1933 in the Lac du Bonnet district. Shipments of the mineral were made by this company to a grinding plant located in Minnesota, U.S.A.; shipments to both United States and Canadian points were continued during the first six months of 1934.

"Metal and Mineral Markets," New York, quote feldspar prices in United States for August, 1934, as follows: per ton, f.o.b. North Carolina, potash feldspar, 200 mesh, white, \$17 in bulk; soda feldspar, \$19. F.O.B. Main, potash feldspar, white, 200 mesh, \$17 in bulk. Granular glass spar, white, 20 mesh, f.o.b. North Carolina, \$11.50 in bulk; semi-granular, \$10.75; soda feldspar 200 mesh, white, \$19. Virginia: No. 1, 230 mesh, \$18; 200 mesh, \$17; No. 17 glassmakers, \$10.75; No. 18, \$11.50; Enamellers' \$14 to \$16; quotations on Spruce Pine N.C. basis. New Mexico: Crude clean No. 1 potash spar, \$4.75; ground, \$9.50.

Table 215.—Capital Employed in the Feldspar and Quartz Mining Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment..... (Estimated value if rented.)	831,620	1,050,026
(b) Inventory value of minerals on hand, stocks in process, fuel and miscellaneous supplies on hand.....	4,904	37,837
(c) Inventory value of finished products on hand.....	77,679	32,274
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	21,974	23,655
Total.....	936,177	1,143,792

Table 216.—Employees, Salaries and Wages in the Feldspar and Quartz Mining Industry in Canada, 1931 and 1932

—	1932				1933			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	18	2	20	32,462	20	3	23	34,979
Wage-earners.....	100		100	59,141	123		123	82,058
Total.....	118	2	120	91,603	143	3	146	117,037

Table 217.—Number of Wage-Earners on Pay Roll in Feldspar and Quartz Mining Industry, by Months, 1932 and 1933

Month	1932	1933
January.....	69	39
February.....	81	32
March.....	106	34
April.....	56	18
May.....	102	123
June.....	111	172
July.....	122	187
August.....	113	193
September.....	84	200
October.....	90	163
November.....	122	139
December.....	105	132

Table 218.—Production of Feldspar in Canada, by Provinces, 1924-1933

(For the years 1890-1923 see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1924.....	16,147	142,118	28,657	216,422	44,804	358,540
1925.....	11,287	94,730	17,394	141,059	28,681	235,789
1926.....	13,168	111,136	22,783	199,102	35,951	310,238
1927.....	12,730	104,618	17,119	154,533	29,849	259,151
1928.....	12,943	104,789	18,954	180,153	31,897	284,942
1929.....	15,790	133,492	21,737	206,979	37,527	340,471
1930.....	17,074	163,802	9,722	104,667	26,796	268,469
1931.....	10,381	86,842	7,962	100,119	18,343	186,961
1932.....	3,390	39,062	3,657	42,920	7,047	81,982
1933*.....	6,183	59,283	4,387	45,350	10,658	105,117

*Totals for 1933 include 88 tons valued at \$484 representing feldspar mined in Manitoba.

Table 219.—Production in Canada, Imports and Exports of Feldspar, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION—						
Quebec.....	10,381	86,842	3,390	39,062	6,183	59,283
Ontario.....	7,962	100,119	3,657	42,920	4,387	45,350
Manitoba.....					88	484
Total.....	18,343	186,961	7,047	81,982	10,658	105,117
IMPORTS (Crude and ground).....	1,877	37,297	1,487	24,875	561	7,970
EXPORTS.....	10,975	88,913	2,017	15,465	3,596	23,076

Table 220.—World Productoin of Feldspar, 1931-1933(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom (China stone).....	42,650	45,091	33,462	France.....	10,500	(a)	(a)
Canada.....	16,378	6,292	9,516	Germany (Bavaria).....	4,921	3,494	(a)
Australia (including China stone).....	205	1,006	2,570	Italy.....	4,675	5,137	(a)
India.....	334	473	677	Norway.....	16,151	20,249	18,202
FOREIGN COUNTRIES				Roumania (b).....	100	670	(a)
Czechoslovakia (c).....	30,000	30,000	(a)	Sweden.....	32,590	23,319	32,053
Finland (exports).....	66	1,505	2,663	United States (sales).....	147,119	104,715	150,633
				Argentina.....	169	363	370
				Egypt.....	26	176	59
				Manchoukuo.....	853	1,753	(a)
				Brazil.....	592	(a)	(a)

NOTE.—19,987 long tons of feldspar were produced in Russia during the year ended September, 1928; later figures are not available.

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(c) As estimated by the U.S. Bureau of Mines.

Quartz.—Silica production in 1933 and including quartzite, silicious fluxing gravel, lode quartz and natural silica sand, totalled 185,783 tons valued at \$297,820 as compared with 189,132 tons worth \$276,147 in 1932. The 1933 output came from the provinces of Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia.

The following notes relating to silica products are supplied by L. H. Cole of the Department of Mines, Ottawa: "Quartz and quartzite in sizes from 2 to 6 inches are used in the manufacture of ferro-silicon and as a smelter flux. For silica brick, quartzite is crushed to about 8 mesh. Some quartz is also crushed to make silica sand. Silica sand is generally prepared from a friable sandstone by crushing, washing, drying and screening to recover different grades of material according to the industry for which it is required. For example, for the manufacture of glass the

material should range between the 20 and 100 meshes. Silica sand is also being prepared from a friable quartz and from vein quartz. Silex is the washed sand or pure quartz crushed and ground in some form of ball mill, then either air or water-floated to recover the fine flour. The ceramic industry requires 150 mesh or finer while the paint trade requires air-floated material 250 mesh or finer."

"Iron Age" describing abrasives, states: "The type of finish desired also governs the selection of abrasives to some extent. Thus sands produce a so-called matte finish. Ordinary bank or building sands are of little value. Ocean sands are much used, but a carefully selected and prepared white silica sand has greater resistance to disintegration, creates less dust, and enables faster cleaning. Sand is graded into about four sizes, and the smaller sizes are more frequently used for cleaning sheets and rolled forms of brass, bronze, aluminum or steel. Most sands used for sand blasting weigh approximately 97 pounds per cubic foot."

"Most of the sand used for glass making contains more than 99 per cent silica," states the "Chemical Age", London; "quality depends largely on the kind and quality of glass being made. Glass may be classified according to chemical composition or the predominating basic oxide, or by physical characteristics that are largely controlled by the quality of the sand used. On this basis it may be separated into optical glass, requiring sand of the highest purity; flint glass, for high-grade tableware to be cut and polished, requiring sand almost equal to that for optical glass; plate glass to be ground and polished, requiring a high-grade sand; window glass, and plate glass which is used in the form of ribbed or wired glass, requiring a sand of still less purity; green bottle glass, which may contain much more iron oxide and different grades of amber glass, for which a sand with a fairly high content of iron oxide is permissible."

There are now in operation in Canada several modern plants producing high-grade silica products, including sands suitable for glass making, foundries, chemical plants, abrasives, silica brick, etc.

"Metal and Mineral Markets" quote August silica prices in the United States as follows: per ton, water ground and floated, in bags, f.o.b. Illinois: 325 mesh, \$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air-floated, 325 mesh, 92 to 99½ per cent silica, \$20 to \$30. Glass sand, f.o.b. producing plant, \$1.25 to \$5 per ton; moulding sand, 50 cents to \$3.50; blast sand, \$1.75 to \$6. California: \$5 for quartz and \$2.50 for sand.

Table 221.—Production of Quartz in Canada, 1924-1933

(For the years 1890 to 1933 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	150,896	323,156	1929.....	265,949	561,527
1925.....	197,224	363,612	1930.....	226,200	418,127
1926.....	232,082	553,161	1931.....	195,724	303,158
1927.....	233,984	496,364	1932.....	189,132	276,147
1928.....	282,522	523,933	1933.....	185,783	297,820

Table 222.—Production in Canada, and Imports of Quartz, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION—						
Nova Scotia.....	3,116	6,836			1,017	1,447
Quebec.....	26,987	69,759	20,123	71,645	28,294	109,533
Ontario.....	97,888	148,642	66,135	93,574	66,562	86,146
Manitoba.....	67,214	76,624	87,253	102,493	7,736	23,507
Saskatchewan.....					59,506	59,506
British Columbia.....	519	1,297	15,621	8,435	22,668	17,681
Total.....	195,724	303,155	189,132	276,147	185,783	297,820
IMPORTS—						
Silica sand—for glass, etc.....	107,712	235,191	59,176	162,869	64,114	160,131
Silex or crystallized quartz, ground or unground.....	5,238	130,368	6,186	167,997	4,369	82,823
Flint and ground flint stones.....	2,616	23,653	1,926	16,075	2,277	26,615
Silica firebrick—90% silica.....		234,909		122,952		147,901

Table 223.—Silica Consumed in Specified Canadian Industries, 1932 and 1933

Industry	Item	1932		1933	
		Tons	\$	Tons	\$
Roofing paper.....	Silica sand....	238	1,230	1,062	4,586
Glass industry.....	Silica sand....	59,143	290,854	52,585	272,689
Acids, alkalies and salts.....	Silica.....	6,342	20,921	5,800	21,714
Artificial abrasives.....	Silica sand....	5,207	27,588	13,574	68,186
Imported clay products.....	Flint.....	1,136	18,277	752	10,457
Paints, pigments and varnishes.....	Silica*.....	483	14,837	409	12,970

*Includes Silex and infusorial earth.

GYPSUM

The production of gypsum ($\text{CaSO}_4\cdot 2\text{H}_2\text{O}$) is one of Canada's oldest industries. Up to the beginning of this century, Nova Scotia, New Brunswick and Ontario constituted the producing provinces. Manitoba commenced production in 1901, and ten years later, gypsum mining was started in British Columbia.

Production of gypsum in Canada during 1933 totalled 380,234 tons valued at \$663,312 as compared with 438,629 tons worth \$1,080,379 in 1932 and 863,752 tons at \$2,111,517 in 1931. The quantity of the mineral mined in 1933 amounted to 370,691 tons and the tonnage calcined in plants operating in direct conjunction with quarries totalled 44,086.

It is encouraging to note that during the first four months of 1934 the Canadian output totalled 36,983 tons or 172.8 per cent above the tonnage produced in the corresponding period of 1933. An important event in the Canadian gypsum mining industry in 1934 was the clearing, in June, of two steamers for London, England, from Cheticamp, Nova Scotia, with the first large shipments of crude gypsum for the United Kingdom. The Department of Mines, Ottawa, reports that these shipments are the forerunners of regular loadings by the Atlantic Gypsum Products Company to the British markets.

Nova Scotia.—During 1933 the Atlantic Gypsum Products Company operated plants at Cheticamp, Walton and Aspy Bay. Number one quarry of the company, at Cheticamp, was enlarged by connecting the two open-faces into one long face of gypsum. The gypsum was formerly removed from this quarry to the brow of the hill by horse and cart, where it was conveyed down a chute to the cars. Last year the quarry floor was lowered 40 feet, and the gypsum is removed in 10 ton cars equipped with tractor treads and hauled by No. 60 gasoline caterpillar tractors. Diamond drilling was being conducted in the floor of No. 3 quarry to determine its depth of gypsum. The same company commenced operations this year at Aspy Bay where a quarry was opened up and two grades of gypsum made. No. 1 grade is worked by hand selection and the balance or No. 2 grade is handled by a one-half yard power shovel. The two quarries of the company operated at Walton are equipped with steam shovels for removal of overburden. Soft white gypsum is shipped from both quarries, as well as anhydrite; the standard gypsum from Walton goes to New York where it is calcined for use as plaster and the anhydrite is shipped to Norfolk, Virginia, where it is used largely as a fertilizer and moisture retainer around peanut plants.

The Connecticut Adamant Plaster Company operates two quarries at Cheverie where a narrow gauge railway transports the gypsum from the property to the shipping pier. Two faces of white gypsum have been opened up; the company obtains hard plaster from the old quarry located close to the shipping pier.

A new quarry face 30 feet in height was opened last year at Mabou, Inverness county, by the Nova Scotia Coal and Gypsum Company and it is reported that the gypsum near the Company's mill is now being removed by the tunnel system; shipments are made to Montreal by water.

The Windsor Gypsum Company operated the "Mosher" quarry located a mile from Newport station in Hants county. The overburden, 18 to 20 feet thick, is removed by steam shovel and the gypsum is transported over the company's track to Newport station. Shipment to final destination, Newburg, N.Y., is made from Windsor by sailing vessel or steamer.

Spalls from the "Mosher quarry" are purchased by the Windsor Plaster Company and hauled to the calcining plant in Windsor by motor trucks; the Windsor Plaster Company also operates the quarry at Clarksville on the Midland Railway. No gypsum, in the crude form, is shipped by this company. Their hard-wall and selenite plasters are sold throughout the Maritime provinces, and some has been shipped as far west as Montreal.

At Baddeck Bay, Victoria county, the North American Gypsum Company extended the quarry face and conducted a diamond drilling program during the summer. A narrow gauge railway about a mile long connects the deposit with the crushing and storage plant located at the shipping pier on the shore of Baddeck Bay.

The largest gypsum operation in the province is carried on by the Canadian Gypsum Company at Wentworth, Hants county, located about four miles from the town of Windsor. The company is operating two main quarries "The Cables" and "The Meadow". The Cables quarry is the chief producer and is overlaid with about 8 feet of overburden. This is stripped off by steam shovel and holes about 60 feet in depth drilled with well drills. After blasting, the displaced gypsum is loaded by power shovel into light railway cars, hauled up an incline track to the top of the quarry and then transferred to the crushing plant at the shipping wharf. At the Meadow quarry the gypsum loosened by blasting is loaded into cars by gasoline operated shovels, and is then hauled to the crushing plant at the shipping pier. (Annual Report on Mines, 1933, Nova Scotia.)

New Brunswick.—The Canadian Gypsum Company has, in its Hillsborough plant, at Hillsborough, the largest gypsum products plant in the Maritime provinces. This is the only plant in New Brunswick producing calcined gypsum products. In 1933 the demand for gypsum products was further affected by the continual falling-off in construction below that of 1932, so that the lessened production was in line with the building. Raw materials from the Hillsborough plant are exported to the United States and the exportation of gypsum rock was curtailed to the same extent as manufactured products. Hillsborough plants manufactured during 1933 gypsum tile, hollow tile for partitions and solid tile for roofs.

The gypsum operation begun early two years ago by Mr. F. M. Thompson, near Petiteodiac was successfully continued during the past year. High grade gypsum was shipped to Montreal from this property.

Ontario.—The production of Ontario gypsum again revealed a decline, due to the greatly restricted demand in the building trades. The mill and mine of Gypsum, Lime and Alabastine, Canada, Ltd., were in continuous operation at Caledonia throughout the year. The Lythmore plant of the company closed down in November, 1932, and will not be re-opened. At Hagersville the Canadian Gypsum Company, Limited, was active during the year, both their mine and mills being in operation. It is interesting to note that Gypsum, Lime and Alabastine, Canada, Ltd., has announced that a new company (subsidiary)—Gyproc Products Ltd.—has been formed, with head office at London, England. The new English plant of this company is being erected at Rochester, in the county of Kent; this plant was expected to be in operation in the early spring of 1934.

Manitoba.—Gypsum mining and milling operations were conducted during 1933 in Manitoba by both Gypsum, Lime and Alabastine, Canada, Ltd., and by Western Gypsum Products, Limited. The company first referred to operated a quarry at Gypsumville while gypsum mined at Amaranth by the latter company was processed in that company's mill located in Winnipeg. Production in Manitoba during 1933 was considerably less than in the preceding year, the reason apparently being the lessened activities in building construction.

British Columbia.—Gypsum, Lime and Alabastine, Canada, Ltd., operated its Falkland quarries in the Kamloops Mining Division during 1933. This property is situated 30 miles west of Vernon and about two miles north of the Vernon-Kamloops highway; quarrying operations are conducted at three different elevations; in 1933 work was confined to the upper or No. 3 quarry. The British Columbia Department of Mines reports that the production of these quarries during the past calendar year was relatively limited and intermittent. Calcined gypsum produced by the company was utilized in the manufacture of gypsum products.

The following brief excerpts are from the Gypsum Association's publication, (Chicago) "Gypsum, a Non-Metallic Mineral":—

"Gypsum is one of the most ancient of building materials. The Greeks were users of gypsum during the time of Pliny—going further back the Temple of Apollo at Bassae, built 400 B.C., affords an excellent example of the use and permanent structural qualities of gypsum. The great pyramids of Egypt (1580-1350 B.C.) contain plaster work of gypsum executed nearly four thousand years ago. Gypsum is abundant in Europe, Asia, Australia, Canada, Alaska, some of the South American Republics and the United States. In its native state this mineral varies considerably in appearance and physical characteristics and has been given the following names:—rock gypsum, gypsite or earth gypsum, selenite or transparent gypsum, fibrous and satin spar gypsum, and alabaster gypsum, also anhydrous gypsum. . . . Gypsum rock, when quarried or mined, is crushed, dried, and ground to fine powder. This finely ground product is transferred to storage bins from whence it is conveyed to kettles or rotary kiln calciners where it is subjected to heat and during the process of calcination, is kept in constant agitation. The partial dehydration of ground gypsum rock by properly controlled physical processes yields calcined gypsum, sometimes termed plaster of Paris or stucco. . . . It is the method of calcination employed, and the degree to which calcination is carried forward, that determines the possibilities and uses that the calcined product may be applied to in the field of building construction. . . . from the finely ground or disintegrated gypsum which has been calcined to the proper degree, the following are some of the more important products manufactured—gypsum plasters, gypsum finishing plasters, gypsum boards and gypsum tile or block and in addition the following include some of the more important uses of uncalcined (raw) or calcined gypsum for industrial purposes—manufacture of Portland cement, plate glass bedding plaster, agricultural gypsum (land plaster), dental plaster, orthopedic plaster, pottery plaster, terra cotta moulding plaster, pipe covering stucco, foundry core stucco, paper filler, wood filler, paint and cloth filler, manufacture of crayons, matches, etc., and for statuary and other works of art."

The statistics as herein given for Canada cover the primary production of gypsum; these include data for gypsum quarries and for calcining and plaster works when operated in connection with the quarries. In addition there are the secondary or manufacturing plants which include the works making wallboard, blocks, tile, etc.; some of these works purchase crude gypsum from the primary producers and calcine it before using it to manufacture the gypsum products.

In 1933 there were eight of these manufacturing plants in Canada operating as follows:—A plant at Montreal, P.Q., brought crude gypsum from Nova Scotia, calcined it, and produced gypsum wallboard and wall plasters. At Caledonia, Ontario, another manufacturing works brought calcined gypsum from its own quarries and made gypsum blocks, wallboard, accoustical plasters, etc. Gypsum wallboard was also produced at Hagersville, Ontario, the company operating here, also produced wallboard and tile at Hillsborough, New Brunswick. At Winnipeg 2 plants utilized calcined gypsum, obtained from primary plants in that province, in the manufacture of wallboard and tile. At Calgary, Alberta, gypsum wall plasters were manufactured from crude rock obtained from quarries situated in British Columbia while at Port Mann, B.C., a plant utilized calcined gypsum obtained from the Falkland quarries in the production of gypsum blocks, wallboard, tile and dry insulux.

These 8 establishments employed capital amounting to \$2,146,863 and provided employment for an average of 152 employees; salaries and wages totalled \$97,651 and the value of products made during the year was reported at \$980,589 as compared with \$1,222,004 in 1932.

Table 224.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1932 and 1933

	1932			1933		
	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:						
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment. (Estimated value if rented).....	2,489,742	4,456,143	6,945,885	3,613,620	3,996,236	7,609,856
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	30,297	148,342	178,639	29,946	114,819	144,765
(c) Inventory value of finished products on hand.....	228,421	62,468	290,889	226,416	41,564	267,980
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	540,326	98,409	638,735	419,281	327,682	746,963
Total	3,288,786	4,765,362	8,054,148	4,289,263	4,480,301	8,769,564

Table 225.—Employees, Salaries and Wages in the Gypsum Industry in Canada, 1932 and 1933

	1932				1933			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
Salaried employees.....	40	6	46	\$ 90,418	21	4	25	\$ 48,942
Wage-earners—								
Mine.....	291		291		256		256	
Mill.....	141		141		134		134	
Total.....	432		432	278,066	390		390	214,337
Grand total	472	6	478	368,484	411	4	415	263,279

Table 226.—Average Number of Wage-Earners by Months, in the Gypsum Mining Industry for 1932 and 1933

Month	1932		1933	
	Mine	Mill	Mine	Mill
January.....	264	150	89	101
February.....	300	134	86	92
March.....	226	145	81	86
April.....	221	146	164	116
May.....	294	145	224	120
June.....	329	168	279	171
July.....	380	179	393	204
August.....	373	145	495	180
September.....	359	160	345	150
October.....	345	120	367	173
November.....	276	109	333	119
December.....	116	102	209	112

Table 227.—Annual Production of Gypsum in Canada, by Provinces, 1924-1933

(For the years 1874 to 1923 see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Ontario		Manitoba		British Columbia		Canada	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$		\$		\$
1924..	441,752	915,845	36,738	476,804	88,121	467,097	29,375	348,212	30	150	646,016	2,298,108
1925..	551,230	1,070,408	71,745	408,917	82,020	491,833	35,088	417,868	240	865	749,323	2,389,891
1926..	678,107	1,187,918	59,546	468,411	89,987	496,059	35,172	461,461	20,916	156,964	883,728	2,770,813
1927..	829,438	1,512,015	85,293	524,550	83,998	500,688	39,895	512,008	24,493	201,754	1,063,117	3,251,015
1928..	1,013,257	1,850,243	75,033	501,252	85,811	553,271	51,285	609,039	20,982	229,843	1,246,368	3,743,648
1929..	948,895	1,152,160	70,482	485,982	100,347	832,689	67,269	631,051	24,696	243,814	1,211,689	3,345,696
1930..	827,063	982,287	82,674	513,677	94,946	776,069	34,157	298,297	32,128	248,458	1,070,968	2,818,788
1931..	707,817	878,487	58,957	451,264	53,358	374,469	23,076	231,124	20,544	176,173	863,752	2,111,517
1932..	341,508	398,861	38,019	297,520	35,655	186,175	12,719	113,739	10,728	84,084	438,629	1,080,379
1933..	315,948	363,528	30,391	88,500	24,460	112,319	6,830	65,471	5,107	46,004	382,736	675,822

Table 228.—Summary of Statistics on Gypsum in Canada, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Crude gypsum mined.....	882,890		439,695		370,691	
Crude gypsum calcined.....	167,335		80,755		44,086	
PRODUCTION BY GRADES—						
†Crude—						
Lump.....	47,147	103,396	98,672	114,504	36,439	43,002
Crushed.....	693,764	791,910	268,645	314,336	298,579	329,419
Fine ground.....	4,418	21,392	1,826	10,459	1,030	6,067
(a) Calcined.....	118,423	1,194,819	69,486	641,080	46,688	297,334
Total.....	863,752	2,111,517	438,629	1,080,379	382,736	675,822
PRODUCTION BY PROVINCES—						
†Nova Scotia.....	707,817	878,487	341,508	398,861	315,948	363,528
New Brunswick.....	58,957	451,264	38,019	297,520	30,391	88,500
Ontario.....	53,358	374,469	35,655	186,175	24,460	112,319
Manitoba.....	23,076	231,124	12,719	113,739	6,830	65,471
British Columbia.....	20,544	176,173	10,728	84,084	5,107	46,004
Total.....	863,752	2,111,517	438,629	1,080,379	382,736	675,822
IMPORTS—						
Gypsum, crude (sulphate of lime).....	484	13,491	55	1,381	18	524
Plaster of Paris, or gypsum ground, not calcined.....	158	4,476	171	3,434	136	4,251
Plaster of Paris, or gypsum calcined and prepared wall plaster.....	11,050	120,516	1,384	31,165	615	16,745
Total.....	11,692	138,483	1,610	35,980	769	21,520
EXPORTS—						
Gypsum or plaster crude.....	618,765	741,376	372,314	470,247	287,305	344,085
Plaster of Paris, ground and prepared wall plaster.....	3,085	50,774	798	13,979	634	13,999
Total.....	621,850	792,150	373,112	484,226	287,939	358,084

†Shipments of crude gypsum include some anhydrite produced in Nova Scotia.

(a) Does not include gypsum calcined in manufacturers' plants in Calgary and Montreal.

Table 229.—World Production of Gypsum, 1931-1933

(Supplied by *Imperial Institute*)
(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	754,895	995,462	985,055	Latvia (exports).....	32,014	37,759	48,130
Canada.....	788,286	392,585	330,974	Luxemburg.....	9,117	9,254	12,643
Union of South Africa.....	14,613	7,001	11,622	Roumania (b).....	52,166	39,386	(a)
Cyprus (estimated).....	15,300	12,000	14,000	Spain (g).....	1,295,576	1,133,282	1,070,509
Palestine.....	483	1,458	2,561	Sweden.....	49	113	43
India.....	53,632	51,421	33,142	Algeria.....	74,416	85,970	82,083
Australia.....	27,732	53,970	60,572	Belgian Congo.....	1,000	(a)	(a)
Total.....	1,655,000	1,514,000	1,438,000	United States.....	2,284,837	1,264,530	1,192,136
FOREIGN COUNTRIES				Tunis (estimated).....	25,000	25,000	25,000
Austria (d).....	47,000	35,000	(a)	Argentina.....	38,849	33,013	34,255
Estonia.....	7,727	8,168	5,670	Chile.....	12,965	11,800	(a)
France.....	2,787,253	(a)	(a)	Peru.....	8,000	(a)	(a)
Germany (e).....	556,000	392,200	477,000	China.....	69,266	52,400	64,100
Poland.....	24,000	(a)	(a)	Egypt (estimated).....	130,000	130,000	130,000
Greece (b).....	6,400	4,334	(a)	New Caledonia.....	11,365	11,719	11,380
Italy (including alabaster).....	578,561	521,453	525,395	Morocco (French).....	69,288	(a)	(a)
Yugoslavia.....	823	.....	927	Brazil (estimated).....	2,000	2,000	2,000
				Total (f).....	8,050,000	(a)	(a)
				Grand Total (f)....	9,700,000	(a)	(a)

(a) Data not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(c) Estimated by Bundesministerium für Handel und Verkehr.

(d) Figures supplied by Deutsche Gips-Verein, E.V., Berlin

(e) Excluding the production of U.S.S.R. (Russia), which was recorded as 404,068 long tons during the year ended September, 1928, the latest year for which information is available.

(g) Including 407,047 cubic metres and 343,028 cubic metres of gypsum, also 60 cubic metres and 80 cubic metres of alabaster during 1931 and 1932 respectively, converted as per (b).

IRON OXIDES (OCHRE)

In 1851, an important deposit of ochre was worked at Pointe du Lac, St. Maurice county, Quebec, and shipments of dried ochre were made to the United States; subsequently, this property was abandoned. Thirty-two years later the manufacture of dry ochre was commenced on a small scale in Iberville township on the Little Romaine river. This deposit was later abandoned but in 1916 it was re-opened and a small quantity of crude ochre was taken out for use as a pigment in the paper industry. A deposit was opened up at St. Malo, Champlain county, in 1885 and a calcining plant erected. Calcined ochre was shipped from the mill to Montreal where it was further prepared for use in the manufacture of paint.

Sales of ochreous iron oxide in Canada during 1933 totalled 4,357 tons valued at \$53,450 as compared with an output of 5,240 tons worth \$46,161 in 1932. This material, during 1933, came entirely from the provinces of Quebec and British Columbia, deposits in the former province contributing 96 per cent of the total. The greater part of the recent production in Quebec has originated at Red Mill, Point du Lac and Les Forges, these deposits all being situated near Three Rivers; in British Columbia the mineral was mined near Rainbow Lodge.

In Quebec the preparation of the crude oxide in 1933 included dehydration, calcining and milling with air flotation; products from properties in this province were marketed in Canada, United States and England. The Canadian output of uncalcined natural ochre is employed principally in the purification of artificial fuel gas whereas the calcined product is absorbed in the paint industry; the output of the mineral in British Columbia is utilized solely in gas plants.

The Department of Mines, Ottawa, reports that the present producing localities have met the requirements of the domestic pigment trade for the cheaper grades for many years past; should the demand increase, there are other prospective deposits which could be drawn upon, two of which are located in Saguenay county, Quebec. In Nova Scotia there are various beds of ochres and umbers which have been worked to some extent in the past and deposits of ochres are also known to exist in Alberta.

During 1932 research work conducted at Red Mill, Quebec, resulted in an improved process of furnacing natural iron oxides; pigments of greater strength and brilliance than formerly made were obtained experimentally.

The following brief description of the treatment of ochres in the southern United States is from The Engineering and Mining Journal and may prove of interest to Canadian producers of natural iron oxides:

"The crude ochre mined on the company's property in the Cartersville region is separated into two grades—light and dark..... the ore is passed through a common log washer to remove coarse rock, hard iron and sand. The ochre goes into suspension with water and the pulp is then screened and flumed to cone classifiers for further removal of fine sand down to 300 mesh. Overflow from these cones, carrying the ochre in suspension, is then flumed to Dorr tanks, from which the ochre mud is pumped into tempering tanks and thence into revolving steam drums for drying. After drying the ochre is stocked in bins to be later passed through a beater mill and packed as required."

Ochre prices in the United States were quoted April 19, 1934 in "Metal and Mineral Markets" as follows: per ton, f.o.b. Georgia mines, \$19 in sacks; \$22.50 in barrels. Buff clay, 98 per cent through 325 mesh, \$19. F.O.B. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, \$19.50.

"Canadian Chemistry and Metallurgy" quotes iron oxide Canadian prices, April, 1934, as follows: Red, natural, lb. .02--08; Red, artificial, lb. .05½--10; Black, C.P., .15; Yellow, conc., ppt., casks, lb., .09--13; Yellow, domestic, ppt., lb., .05½--06.

Table 230.—Consumption of Iron Oxides in Canada, 1931-1933

Oxide or purifying materials used in Canadian coke and gas making	Tons	\$
1931.....	5,362	50,029
1932.....	3,736	35,284
1933.....	2,734	29,076
Iron oxide pigments used in the Canadian Paints, Pigments and Varnishes Industry	Pounds	\$
1931.....	1,828,540	67,752
1932.....	1,402,025	52,323
1933.....	1,008,181	43,826
Ochres, siennas and umbers used in the Canadian Paints, Pigments and Varnishes Industry	Pounds	\$
1931.....	1,166,860	86,539
1932.....	1,025,240	48,037
1933.....	981,554	43,671

Table 231.—Capital Employed in the Iron Oxides Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment.....	152,144	117,783
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	21,916	18,418
(c) Inventory value of finished products on hand.....	31,726	19,950
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	1,077	400
Total.....	206,863	156,551

Table 232.—Employees, Salaries and Wages in the Iron Oxides Industry in Canada, 1932 and 1933

Class	1932		1933	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
		\$		\$
Salaried employees.....	1	3,240	2	3,212
Wage-earners.....	25	10,669	20	12,419
Grand total.....	26	22,909	22	15,631

Table 233.—Production of Iron Oxides in Canada, 1924-1933

(For the Years 1883 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	7,266	91,160	1929.....	6,518	115,932
1925.....	7,118	91,913	1930.....	6,597	83,873
1926.....	6,626	101,843	1931.....	5,520	49,205
1927.....	6,125	103,536	1932.....	5,240	46,161
1928.....	5,414	111,198	1933.....	4,357	53,450

Table 234.—Production in Canada, Imports and Exports of Iron Oxides, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION.....	5,520	49,205	5,240	46,161	4,357	53,450
IMPORTS—						
Ochres, ochrey earths, siennas, and umbers.....	1,666	57,825	1,212	41,806	1,077	35,595
Oxides, fire proofs, rough stuffs, fillers and colours, dry, n.o.p.....	3,170	639,863	2,359	616,124	2,491	573,607
EXPORTS—						
Mineral pigments, iron oxides and ochres...	742	50,951	785	55,306	1,287	73,139

MICA

The output of mica in Canada during 1933 totalled 944 tons valued at \$49,284, as compared with 309 tons worth \$6,828 in 1932.

The mineral in 1933 was produced in Quebec, Ontario and British Columbia, with the greater part of the Dominion output coming, as in former years, from the two first named provinces. The increases of 205·6 per cent in quantity and 621·8 per cent in value of the 1933 production over that of the preceding year indicates a distinct improvement in business conditions throughout the mica consuming industries and more especially in those specializing in the manufacture of electrical equipment. An interesting feature of mica movements during the last calendar year and early months of 1934 was the pronounced upward trend of Canadian exports to the United Kingdom. This would not only suggest that the high quality of Canadian mica was receiving broad recognition in the British market but that the increasing demand for the Canadian product was international in scope.

"The mica of commerce is derived exclusively from granite pegmatites and basic magnesian rocks known as pyroxenites. The former yield the potash variety muscovite, or white mica, while the latter furnish phlogopite, or amber mica. Practically the whole of the Canadian production consists of phlogopite. This variety is far less common than muscovite, which constitutes the bulk of the world's supply of mica, and, outside of Canada, few occurrences are known. The most important of these are in Madagascar..... Phlogopite is also known to occur in Chosen (Korea), Ceylon, Mexico and Central Africa..... Muscovite, on the other hand, is widely distributed..... India is by far the largest producer of muscovite mica.

Lepidolite, or lithia mica, in deposits of possible economic value, occur in the Pointe du Bois district, northeast of Winnipeg, in Manitoba. The lepidolite of the Manitoba deposits has no value as sheet mica. Fuchsite (chrome mica) schist has been shipped from this same district. It was crushed and used in Winnipeg for stucco purposes. This is believed to be the only case on record of fuchsite being mined and utilized commercially.

"In mining, mica crystals, or "books" as they are sometimes termed, usually break up into plates an inch or more in thickness. These are recovered from the pit and taken to a cobbing and trimming shed at the mine. Here, adhering rock is broken off, the plates are roughly split and most of the waste, broken or imperfect mica is recovered. The resulting sheets, termed "rough-cobbed" mica, are usually shipped to centrally located mica "shops" where they undergo a further

splitting and trimming and are graded according to size and quality. Practically all of the work necessary to prepare mica for the market is performed by hand with the aid of a small splitting knife. Almost the entire recorded world's production of sheet mica, to-day, is utilized in the electrical industries. Among its more important uses for such purposes are:—

1. For separating the copper bars of commutators and for commutator rings, cones and cores
2. For electrical heating units, such as cookers, irons and toasters.
3. For disks, washers, bushings, etc., in all types of electrical power and lighting equipment.
4. For tubes for induction coils, commutator sleeves, rheostat rods, and general high potential insulating purposes.
5. For separating the plates or leaves of electrical condensers.

"A certain amount of clear sheet muscovite finds employment in stove doors, lamp canopies, gas masks, etc. Ground mica, made from mine waste or shop scrap, finds various uses and production has been considerably increased in recent years. The roofing industry probably absorbs the greater part of the ground mica produced. Coarsely ground mica, chiefly muscovite, is used for Christmas tree "snow." The finest grade of ground mica is taken by the wall-paper trade; only white mica is suitable for this purpose. Ground mica is also used, for its decorative effect, to surface stucco and plaster and in concrete. The rubber trade uses a considerable amount of ground mica in the manufacture of tires, the mica serving as a lubricating or dusting medium during stages of manufacture." (H. S. Spence—Report 701—Department of Mines, Ottawa).

During 1933 mica trimming shops were operated in both Quebec and Ontario. In the former province mining was conducted in the townships of Hull, Wakefield and Cameron of the Buckingham-Hull area and at Laurel in Argenteuil county and in Bergeronnes township, Saguenay county. In Ontario shipments were made principally from stocks on hand and were reported from the Bancroft, Sydenham, and Bob's Lake areas. In British Columbia the output came from Armstrong in the Yale district. Ground mica sales were reported by producers in all three of the mica producing provinces. Ground mica was consigned to the roofing, rubber, oil refining and other industries, while the higher grades of sheet mica were sold for the manufacture of electrical equipment.

The Department of Mines, Victoria, B.C., reports that several deposits of fair-grade sericitic mica, varying in colour from white to greyish white, have been discovered in the Tuck Inlet area contiguous to Prince Rupert and also in the Baker Inlet section about 35 miles south of Prince Rupert. A small amount of work has been done on these deposits and samples submitted to provincial consumers have aroused some interest.

The Department of Mines, Southern Rhodesia, states that "the market for Rhodesian mica has almost entirely disappeared. This, to some extent, may be due to unsatisfactory grading and classification of the Rhodesian mica, as it has been reported from overseas that it was not unusual to find smaller sizes of mica in cases than the grading indicated." The market for clear ruby mica is stated to be showing considerable improvement and there is a possibility that Rhodesian producers may have an opportunity of finding buyers for their product provided they can forward consignments carefully graded and classified. The value of the mica production in Southern Rhodesia in 1933 was reported at £389.

A report by the United States Department of Mines contains the following information: "During the five years 1928-1932 inclusive, domestic marketed production has supplied only 16 to 36 per cent by quantity and 17 to 39 per cent by value of the requirements of sheet mica larger than punch and less than 5 per cent of the consumption of mica splittings. On the other hand, the United States produces virtually all the punch muscovite and most of the scrap mica it consumes. India furnishes the greater part of the sheet muscovite larger than punch and almost all the muscovite splittings required by the United States. Canada and Madagascar supply phlogopite in the form of splittings and sheet mica."

"Vermiculite" was of little or no commercial value prior to 1925. The term "vermiculite" is applied to a group of micaceous minerals that generally are alteration products of biotite, phlogopite and other varieties of mica. The most pronounced characteristic of vermiculites is their

extraordinary expansion on heating; the volume may increase up to sixteen times the original . . . vermiculite is of little or no value in its raw state and the following applications relate to the treated material. Its value in heat and cold insulation has been demonstrated and it is an effective sound insulator. Vermiculite has been recommended as an insulating material in fireless cookers, incubators, ovens, pipe and boiler coverings, and refrigerators . . . as a sound deadener it is of particular value in moving picture studios and apartment houses. Insulating cements made from Colorado vermiculite are now on the market. The mineral is also used in the manufacture of insulating brick, automobile mufflers and high-temperature gaskets." (United States Bureau of Mines—Information circular 6720.)

The consumption of mica in the Canadian electrical apparatus and supplies industry in 1933 totalled 35,098 pounds valued at \$27,129 as compared with 102,410 pounds at \$68,747 in 1932.

The reported consumption of ground mica in the manufacture of Canadian composition roofing in 1933 amounted to 48 tons valued at \$1,849 compared with 21 tons worth \$683 in 1932.

Table 235.—Imports into and Consumption of Mica in the United Kingdom, 1931-1933

Year	Tons	Value
1931.....	1,984	£ 244,994
1932.....	1,634	172,926
1933.....	1,882	218,421

Table 236.—General Imports of Mica into the United States, 1933

	Pounds	Value
Unmanufactured (dutiable).....	3,842,673	\$ 176,773
Cut or split (dutiable).....	1,040,046	202,215
Manufactures (dutiable).....	556,461	13,794

Table 237.—Capital Employed in the Mica Mining Industry in Canada, by Provinces 1932 and 1933

	1932			1933		
	Quebec	Ontario	Canada	Quebec	Ontario	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:						
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment.....	19,352	27,037	46,389	206,243	27,037	233,280
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	34,216	1,653	35,869	35,548	1,935	37,483
(c) Inventory value of finished products on hand.....		914	914	3,040	2,789	5,829
(d) Operating capital (cash bills and accounts receivable, prepaid expenses, etc.).....	35,255	1,243	36,498	33,873	1,931	35,804
Total.....	88,823	30,847	119,670	278,704	33,692	312,396

Table 238.—Employees, Salaries and Wages in the Mica Mining Industry in Canada, 1932 and 1933

	1932		1933	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
		\$		\$
Salaried employees.....	1	1,750	3	2,242
Wage-earners.....	8	6,114	38	22,765
Total.....	9	7,864	41	25,007

Table 239.—Production of Mica in Canada, by Provinces, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1924.....	1,677	185,020	2,414	172,252	4,091	357,272
1925.....	2,415	178,800	1,605	82,663	4,020	261,463
1926.....	1,664	170,118	881	59,086	2,545	229,204
1927.....	1,454	99,194	1,284	75,183	2,738	174,377
1928.....	1,101	54,224	2,559	32,944	3,660	87,168
1929.....	1,062	72,630	2,991	45,919	4,053	118,549
1930.....	430	61,729	740	34,275	1,170	96,004
1931.....	290	30,601	1,049	23,465	1,339	54,066
1932.....	41	4,076	268	2,752	309	6,828
*1933.....	256	39,060	666	9,371	944	49,284

* Total for Canada includes 22 tons valued at \$853, produced in British Columbia.

Table 240.—Production of Mica in Canada, by Grades, 1932 and 1933

	1932			1933		
	Pounds	Value f. o. b. shipping point	Price per pound	Pounds	Value f. o. b. shipping point	Price per pound
		\$	\$		\$	\$
Knife-trimmed.....				8,591	3,923	0.46
Thumb-trimmed.....	2,019	1,254	0.62	51,881	8,397	0.16
Splittings only.....	3,350	2,014	0.60	74,550	27,446	0.37
Scrap.....	612,980	3,560	0.06	1,753,375	9,518	0.005
Total.....	618,349	6,828		1,888,397	49,284	

Table 241.—Production in Canada, Imports and Exports of Mica, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION—						
Quebec.....	290	30,601	40	4,076	256	39,060
Ontario.....	1,049	23,465	269	2,752	666	9,371
British Columbia.....					22	853
Total.....	1,339	54,066	309	6,828	944	49,284
IMPORTS—						
Mica and manufactures of, n.o.p.....		92,294		71,749		33,506
EXPORTS—						
Rough-cobbed and thumb-trimmed.....	24	3,428	1	177	26	6,445
Splittings.....	19	14,672	50	26,833	38	29,479
Scrap and waste.....	1,232	32,600	300	2,843	1,076	9,560
Plate and manufactures (micanite).....		797		1,260		729
Total.....		51,497		31,113		46,213

Table 242.—World Production of Mica, 1931-1933

(Supplied by *Imperial Institute*)
(Long tons)

Country and description	1931	1932	1933	Country and description	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES			
Northern Rhodesia.....	1		1	Norway.....	15	31	5
Southern Rhodesia.....	66	13	4	Sweden.....	64	60	67
Tanganyika Territory.....	9	12	11	Madagascar—			
Union of South Africa (b)...	843	242	391	Muscovite.....	14	(88 lb.)	(692 lb.)
Canada—				Phlogopite.....	217	136	(a)
Knife-trimmed.....			4	United States (sales)—			
Thumb-trimmed.....	22	1	23	Sheets (uncut).....	430	151	163
Splittings.....	17	2	33	Scrap.....	5,912	6,286	7,813
Scrap.....	1,156	274	783	Argentina.....	50	54	74
Ceylon (exports).....	2	2		Brazil (exports).....	54	41	(a)
India (exports)—				Korea.....	17	20	23
Sheet.....	414	335	839	Italy.....	12	9	(a)
Splittings.....	2,275	2,016	2,047	Bolivia (exports).....	1	8	(a)
Australia.....	29	30	42				
Nigeria.....	(17 cwt.)	(17 cwt.)					

NOTE.—1,469 long tons of mica were recorded as produced in U.S.S.R. (Russia) during year ended September 1928—later figures are not available.

(a) Information not available.

(b) Nearly all scrap.

The following amounts of lithia mica were produced: (long tons)—

	1931	1932	1933
South West Africa.....	100	....	....
Czechoslovakia.....	7	....	(a)
Germany.....	404	(a)	(a)
Portugal.....	564	2,014	870
France.....	900	(a)	(a)

SALT

The production of salt in Canada during 1933 totalled 280,115 tons valued at \$1,939,874 as compared with 263,543 tons worth \$1,947,551 in 1932 and 259,047 tons at \$1,904,149 in 1931. The 1933 output is the third largest in the history of Canadian salt mining, being surpassed only by the productions of 1928 and 1929. Although there was a relatively small production during the first two months of 1934, the pronounced increase in March and April would suggest the resumption of the almost steady upward trend in production as experienced since 1931.

"The salt industry of Canada is one of the oldest non-metallic industries of the country, dating back to the early years of the last century when the Hudson's Bay Company obtained their local supplies from the brine springs of the MacKenzie basin. The discovery of salt in Ontario in 1866 was, however, the real beginning of the industry on a substantial basis, and production from the Ontario field has been continuous since that time. The opening of the Malagash deposits in Nova Scotia in 1918 inaugurated the first rock salt mine in the country, and has materially assisted in supplying the demands for salt in the Maritimes . . . Salt finds a use in a large number of industries, and the consumption for domestic use forms a steady demand, depending on the population. The increasing use of salt in Canada for the manufacture of chemicals has, in recent years, caused a rapid rise in the production of salt, and there is every reason to look forward to a rapid expansion of the industry as the country grows." (Report 716—The Salt Industry of Canada—Department of Mines, Ottawa.)

During the year reviewed by the Department of Mines, Nova Scotia, the Malagash Salt Company, Ltd., Malagash, Cumberland county, Nova Scotia, produced 34,005 tons of salt. This was an increase of 4,923 tons over the output of the preceding year. Up to the end of the 1933 shipping season the mine worked very steadily. Development has reached the No. 13 level, nine hundred feet vertically below the surface on the Lucas seam. It is interesting to note that since the brine of this company used for off-colour salt and fine screenings has been reduced in the evaporator, the brine for this operation is now obtained underground on No. 4 level. Fresh water is sprayed on the face of the salt and circulated until it is 100% brine; this is then pumped to the evaporator on the surface.

In Ontario, Brunner, Mond Canada, Ltd., operated continuously throughout 1933. Saturated brine, obtained by forcing water into wells, is utilized by this company in the manufacture of chemical products. At Sarnia the Dominion Salt Company was in operation 337 days and

employed vacuum pans and grainers for the production of various grades of salt. The Goderich Salt Co. Ltd., operating wells at Goderich, was active during the entire year. Vacuum and open pans are used by this company and a variety of grades were manufactured; in the same town, Western Canada Flour Mills Co. Ltd., employing exhaust steam, was in operation 309 days and produced various salt products. Canadian Industries Limited conducted continuous operations at Sandwich and in addition to producing table salt, etc., employed brine in the electrolytic process for the manufacture of caustic soda, liquid chlorine, synthetic muriatic acid, synthetic ammonia and sulphur dichloride. Triple effect vacuum pans are utilized by this company for making fine salt and grainers employed for coarse grades. The Warwick Salt Co. Ltd. was a new producer in Ontario in 1933; this company utilized open pans in the production of salt in Warwick township.

The only 1933 production in Manitoba came from Neepawa where the grainer system was used by the Neepawa Salt Co. Ltd. This company was in operation from April until October.

Saskatchewan became a salt producing province during the past year when the Simpson Oil Company Ltd. commenced the manufacture of coarse salt near Simpson. This company was active throughout the year.

Commercial production of salt may be recorded for Alberta in 1934 as the Triple A Salt Co. Ltd., Edmonton, reported that construction of a salt producing plant would be commenced in northern Alberta about the middle of May, 1934.

Canadian Industries Limited have announced the construction of a new caustic soda and chlorine plant at Cornwall, Ont. In this case the location was based on an analysis of the development of the caustic soda-chlorine market, having in mind the location of the company's salt plant at Windsor, Ontario. Cornwall is well suited from an electric power standpoint, and is over 500 miles closer to the Quebec and Montreal markets than the original works at Windsor. Salt will be transported by water from the company's wells at Sandwich. The estimated cost of the plant and equipment is \$900,000. (Canadian Chemistry and Metallurgy.)

"Although most of the world's iodine is obtained as a by-product from the recovery of sodium nitrate in Chile, an increasing quantity has been obtained in the United Kingdom, during recent years, from sea-weed along the coasts of Ireland and Scotland, states the "Imperial Institute, London"; the Scottish kelp industry is over 200 years old . . . usually the weed is dried and burned in kilns, the yield of iodine varying from 10 to 28 pounds per ton of ash. The resulting ash (kelp) is leached with water and the iodine separated by chemical treatment . . . In Northern Ireland considerable quantities of weed are collected on the coast of Rathlin Island and the east coast of county Antrim and county Down . . . in the Irish Free State large quantities of weed are gathered on the west coast from Donegal to Kerry. The value of kelp produced in the Free State during 1932 was stated to be £30,000.

"One of the most interesting developments in Empire mineral production is proceeding in Palestine, where Palestine Potash Ltd. is producing potassium salts and bromine from Dead Sea waters. Previous to the Palestine venture, the Empire depended almost entirely on foreign countries for its potash supplies, the only production being a small output of potassium nitrate obtained from soil of old village sites in India. The water is now pumped from a depth of 175 feet where it is said, the potassium and bromine compounds reach their maximum concentration."

The negotiations that extended over several months between the syndicates controlling the German rocksalt and saline salt industries respectively were successfully concluded and on January 20, 1934, the Deutscher Salz-Bund, which is to have a duration of ten years, was brought into being. The participants are the Nord Deutscher Salinen Vereinigung, the Deutscher Steinsalz Syndikat and Verband Sueddeutscher Salinen and the Huttensalz Werk Heilbronn. This means that the whole German salt industry is now in the hands of one syndicate, which will look after production, quotas, prices, sales conditions, etc. It is understood, though, that the syndicate is not to control the sale in Germany of salt as a chemical raw material, nor is it to have any control over the German export trade in salt . . . about 10 cwts. a day of iodine, with a purity of more than 99 per cent, is now being manufactured by three producers in Los Angeles county, California.

The iodine is produced from the oil well brines of southern California, these brines containing from 30-70 parts per million of iodine, these producers meet the equivalent of the entire United States demand for the halogen . . . Total salt production in Australia in 1933 was 82,000 tons, after the 77,400 tons in 1932 and 78,800 tons in 1931 . . . The plant erected by the Ethyl-Dow Chemical Co. in North Carolina, U.S.A., at the mouth of the Cape Fear river, is now in operation, removing about 15,000 pounds of bromine per day from sea water and converting it into ethylene dibromide at an efficiency somewhat over 90 per cent." (The Chemical Trade Journal and Chemical Engineer, London.)

"The possibility of obtaining potash and aluminium salts from the mineral leucite has received attention, but in spite of the occurrence of large deposits in the Empire, such as those in Uganda, it seems unlikely that this source of potash will be exploited in the Empire in the near future."

Table 243.—Capital Employed in the Salt Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Cost of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	3,055,911	2,910,371
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	163,760	152,093
(c) Inventory value of finished products on hand.....	80,365	142,497
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc).....	504,972	503,397
Total.....	3,805,008	3,708,358

Table 244.—Employees, Salaries and Wages in the Salt Industry in Canada, 1932 and 1933

	1932				1933			
	Number of employees		Total	Salaries and wages	Number of employees		Total	Salaries and wages
	Male	Female			Male	Female		
Salaried employees.....	46	16	62	\$ 133,449	46	17	63	\$ 144,454
Wage-earners.....	246	37	283	321,600	337	.....	337	328,966
Total.....	292	53	345	455,049	383	17	400	473,420

Table 245.—Number of Wage-Earners on Pay roll in the Salt Industry on the 15th of each Month, 1932 and 1933

Month	1932		1933	
	Male	Female	Male	Female
January.....	230	36	248	37
February.....	239	34	258	37
March.....	244	37	276	38
April.....	252	37	281	36
May.....	257	37	288	36
June.....	265	37	318	37
July.....	260	39	342	37
August.....	256	39	363	37
September.....	260	38	333	37
October.....	238	37	316	38
November.....	238	40	317	40
December.....	216	39	287	39

Table 246.—Production of Salt in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	207,979	1,374,780	1929.....	330,264	1,578,086
1925.....	233,746	1,410,697	1930.....	271,695	1,694,631
1926.....	262,547	1,480,149	1931.....	259,047	1,904,149
1927.....	268,672	1,614,667	1932.....	253,543	1,947,551
1928.....	299,445	1,495,971	1933.....	280,115	1,939,874

Table 247.—Production of Salt in Canada, by Grades, 1932-1933

Grade	1932			1933		
	Manu- factured	Sold	Value of salt sold (not including containers)	Manu- factured	Sold	Value of salt sold (not including containers)
	Tons	Tons	\$	Tons	Tons	\$
Table, dairy and pressed blocks.....	61,168	60,128	1,194,649	63,894	61,231	1,120,698
Common fine.....	58,472	59,036	349,571	67,414	63,786	395,609
Common coarse.....	44,757	47,499	304,482	18,472	18,118	179,891
Land salt.....	583	583	2,349	493	305	952
Other grades.....	55	55	258	34,396	31,935	137,984
Brine for chemical works (salt equivalent sold or used).....	96,242	96,242	96,242	104,740	104,740	104,740
Total.....	261,277	263,543	1,947,551	289,409	280,115	1,939,874
Value of containers.....			560,413			591,182
Grand Total.....	261,277	263,543	2,507,964	289,409	280,115	2,531,056

Table 248.—Production in Canada, Imports, Exports and Consumption of Salt, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION.....	259,047	1,904,149	266,543	1,947,551	280,115	1,939,874
IMPORTS—						
Salt, for the use of the sea or gulf fisheries	56,166	248,155	27,798	100,939	54,439	184,278
Salt, in bulk, n.o.p.....	40,323	177,738	39,065	177,623	51,486	222,082
Salt, n.o.p., in bags, barrels, etc.....	34,107	309,203	34,990	307,195	29,558	240,657
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	294	16,842	180	10,197	137	4,220
Total.....	130,890	751,938	102,033	595,954	135,620	651,237
EXPORTS.....	6,126	55,110	5,627	36,248	5,335	43,461
APPARENT CONSUMPTION OF SALT.....	383,816	2,600,977	359,949	2,507,257	410,400	2,547,650

Table 249.—Available Statistics on Consumption of Salt, by Canadian Industries, 1932 and 1933

Industries	1932		1933	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	32,193,600	170,385	43,551,200	216,618
Slaughtering and meat packing.....		252,918		268,232
Acids, alkalies and salts—Brine (salt content).....	192,484,000	38,696	209,442,000	104,721
Dry.....	19,521,609	50,363	21,964,916	54,605
Soaps.....	3,974,693	24,658	4,989,624	32,832
Bread and other bakery products.....	13,114,360	130,696	11,845,400	127,861
Fruit and vegetable preparations.....	5,842,599	40,337	5,589,322	39,515
Biscuits, confectionery, etc.....	949,200	11,761	1,004,360	11,745
Foods, breakfast.....	918,200	6,246	1,108,036	8,046
Other food industries.....	1,273,839	12,042	2,033,768	18,211
Dyeing, cleaning and laundry work.....	4,755,013	41,996	3,827,468	34,516
Dyeing and finishing of textiles.....	1,015,600	6,068	1,217,811	9,493

Table 250.—World Production of Salt, 1931-1933

(Long tons)

(Supplied by *Imperial Institute*)

Producing country and description	1931	1932	1933
BRITISH EMPIRE			
United Kingdom—			
Rock-salt.....	21,553	19,567	21,596
Brine-salt.....	1,876,011	2,196,632	2,342,579
Malta.....	1,170	1,200	1,200
Mauritius (estimated)—			
Sea-salt.....	1,500	1,500	1,500
Nigeria (estimated).....	400	400	400
Somaliland (exports)—			
Sea-salt.....	115	2,003	2,704
South West Africa.....	1,076	2,069	3,094
Anglo-Egyptian Sudan.....	11,256	9,223	(a)
Tanganyika Territory—			
Brine-salt.....	4,378	6,607	7,209
Sea salt.....	2,359		
Uganda.....	1,878(b)	723(b)	1,492
Canada.....	228,224	233,283	258,401
British West Indies (exports)—			
Sea-salt—			
Bahamas.....	12,250	250	2,820
Grenada.....	129		
Leeward Islands.....	2,316	759	34
Turks and Caicos Islands.....	26,929	20,625	24,566
Ceylon.....	44,819	17,703	8,222
Cyprus (estimated).....	3,000	3,000	3,000
India (including Aden)—			
Rock-salt.....	161,893	172,043	170,164
Salt.....	1,677,507	1,438,818	1,542,220
Palestine—			
Rock-salt.....	1,239	964	864
Australia—			
Victoria (estimated).....	50,000	50,000	50,000
Western Australia.....	3,938	2,771	(a)
South Australia.....	68,666	60,063	58,587
Total.....	4,200,000	4,200,000	4,500,000
FOREIGN COUNTRIES			
Austria—			
Rock-salt.....	848	799	1,058
Brine-salt.....	120,675	167,876	138,447
Bulgaria—			
Rock-salt.....	3,800	3,327	(a)
Sea-salt, etc.....	22,000	32,000	10,000
Czechoslovakia—			
Rock-salt.....	182,023	169,221	148,987
Brine-salt.....	5,152	5,390	5,105
France—			
Rock-salt and brine-salt.....	1,494,330	1,407,701	1,773,569
Sea-salt.....	383,191	168,800	(a)
Germany—			
Rock-salt.....	2,053,925	2,082,274	1,824,564
Brine-salt.....	483,221	477,713	(a)
Greece—			
Sea-salt (estimated).....	100,000	100,000	100,000
Italy—			
Rock-salt.....	63,373	327,066	338,657
Brine-salt.....	258,634		
Sea-salt.....	746,101	589,137	696,452
Netherlands (sales).....	55,254	59,805	63,923
Poland.....	552,000	380,648	(a)
Portugal—			
Rock-salt.....	24	21,000	26
Roumania—			
Rock-salt.....	250,784	283,520	(a)
Spain—			
Rock-salt.....	152,993	150,272	154,280
Brine-salt and sea-salt.....	722,270	793,780	760,260
Switzerland.....	83,674	79,187	(a)
U.S.S.R. (Russia).....	2,804,200	19,181	(a)
Yugoslavia (brine salt).....	51,912	52,011	43,156
Algeria—			
Rock-salt and sea-salt.....	58,622	56,695	77,632
Abyssinia (estimated).....	10,000	10,000	10,000
Angola (estimated).....	10,000	10,000	10,000
Belgian Congo (estimated).....	80	80	80
Canary Islands (estimated).....	2,000	2,000	2,000
Cape Verde Islands.....	10,900	(a)	1,557
Egypt (exports).....	101,248	139,852	134,108
French Morocco (rock salt).....	(a)	(a)	(a)
French Somaliland (exports).....	13,582	30,306	(a)
French West Africa.....	6,132	1,565	(a)
Italian East Africa (estimated).....	100,000	100,000	100,000

Table 250.—World Production of Salt, 1931-1933

(Long tons)
(Supplied by *Imperial Institute*)

Producing country and description	1931	1932	1933
FOREIGN COUNTRIES—Con.			
Tripoli (estimated).....	20,000	20,000	20,000
Tunis.....	119,272	90,817	(a)
Cuba.....	22,322	31,255	(a)
Mexico (estimated).....	80,000	80,000	80,000
Netherlands West Indies.....	9,272	(a)	(a)
Panama (estimated)—			
Crude salt.....	50,000	50,000	50,000
United States—			
Rock-salt.....	1,655,509	1,414,938	1,593,743
Brine-salt.....	2,946,616	2,473,054	3,090,202
Evaporated salt.....	1,967,580	1,833,412	2,106,209
Argentina.....	156,855	178,277	202,321
Chile.....	36,674	26,190	(a)
Colombia (estimated)—			
Rock-salt.....	24,000	24,000	24,000
Brine salt.....	28,000	28,000	28,000
Sea salt.....	25,000	25,000	25,000
Ecuador—			
Rock-salt.....	144	(a)	(a)
Other salt.....	10,697	14,722	12,803
Peru.....	28,000	(a)	(a)
Venezuela.....	(a)	23,275	(a)
China, including Kwantung Peninsula.....	2,235,000	(a)	(a)
Formosa.....	195,905	103,588	166,939
French Indo-China.....	245,800	226,400	(a)
Iraq (d).....	7,430	(a)	(a)
Japan (c).....	513,029	563,455	620,745
Korea.....	136,000	136,000	136,000
Netherlands East Indies—			
Government production.....	209,019	204,340	83,265
Native production.....	31,206	28,211	(a)
Manchoukuo.....	(e)	220,289	303,946
Philippine Islands—			
Brine-salt and sea-salt.....	41,898	(a)	(a)
Portuguese India (estimated).....	12,000	12,000	12,000
Siam (d).....	193,298	(a)	(a)
Turkey.....	173,000	216,000	(a)
Guatemala.....	9,000	9,000	(a)
Syria (estimated).....	10,000	10,000	10,000
Total*	22,000,000	21,000,000	22,000,000
World's Total*	26,000,000	25,000,000	26,000,000

* Salt is also produced in many countries for which statistics are not available—e.g. Gold Coast, Kenya, Brazil, Bolivia.

(a) Information not available.

(b) Excluding production from Kibero.

(c) Excluding production from salt beds, which, although on government beach lands, have no fixed areas. Figures refer to years ended March 31 following that stated.

(d) Years ended March 31 following that stated.

(e) Included with China.

TALC AND SOAPSTONE

Shipments of talc and soapstone ranging from 50 tons to 1,420 tons were made from Canadian deposits during the period 1886 to 1906. Prior to 1900 the production consisted mainly of impure talc and soapstone shipped from Quebec. It was not until 1900 that mining operations were commenced on the high grade talc deposits of the Madoc district. Ground talc was shipped from this district in 1906. Production advanced during the ensuing years until 1920 when the high mark for the industry was reached, namely 21,671 tons valued at \$166,934, an average of \$7.70 per ton.

The value of talc and soapstone produced in Canada during 1933 totalled \$186,749 as compared with \$159,038 in 1932.

The combined value of these minerals represents an increase of 17 per cent over that of the preceding year and is the highest production value recorded for the industry since 1929. The recent increase in Canadian talc output, together with its rather diversified industrial applications, would appear to indicate a rather broad upward trend in production of manufactures, especially those in which this mineral is an essential constituent.

Soapstone products are produced from a deposit in Broughton township, Quebec. This property was in active operation throughout 1933. The mineral is mainly used, in the shape of blocks, as a refractory lining in alkali recovery furnaces in paper mills using the sulphite process. Powdered soapstone finds a good market as a filler in various industries. Mixed with Portland cement it has been used successfully for interior plastering purposes giving a very white velvet finish. The Quebec Bureau of Mines reports that in the last few years the Broughton Company

has developed additional markets for its products. It is now used in the manufacture of fireless cookers, fireplaces, stoves, wood or coal burners and electrical heaters. Soapstone is easily carved and when polished takes a soft marble-streaked appearance. Various objects such as tobacco jars, candlesticks, clock cases, and book-holders made of carved and polished soapstone have lately been put on the market and have met with a gratifying reception.

The Canadian talc production in 1933, as for some years past, came chiefly from important deposits of foliated white talc located near Madoc, Ontario; two companies operate mines and mills in this area and produce various grades of high quality talc. Preparation of the mineral for the market includes crushing, drying, grinding and bolting; the products from these mills are marketed in Canada, United States and Europe. Both companies were in continuous operation throughout 1933.

In British Columbia shipments of talc were made in 1933 from Anderson and Sooke Lakes; most of the production in this province is consumed in the manufacture of roofing materials. It is interesting to note that the Department of Mines, Ottawa, reports the grinding, in Vancouver, during the year under review, of a small tonnage of imported Manchurian talc.

Ground talc has many present day uses, being employed in the manufacture of lubricants, toilet preparations, glass, paper, textiles, foundry facings and many other products. It is used as a polishing agent for rice, peanuts and glass and as an insulating material and insecticide. Composition roofing is manufactured from lower grades and in the rubber industry it is employed to prevent compounds from adhering to the heated working parts of machinery. Certain massive talcs, free from cracks, grit or iron oxide, are reported by the Bureau of Mines, Washington, D.C., to be employed in the manufacture of the so-called "lava" products; the material which is easily carved in its natural soft state is fashioned into innumerable electrical fittings such as bushings, etc. The articles are then heated, rendering the product hard enough to cut glass. Pencils, crayons and French chalk (tailor's chalk) are also fabricated from massive talc.

United States talc prices as quoted May 21, 1934, by "Oil, Paint and Drug Reporter" were: Domestic, Eastern mines, bags, ton, \$16.00 to \$18.00; Western mines, bags, ton, \$18.00 to \$25.00; Imported, Canadian, car lots, bags, ton, \$23.00 to \$—; less carlots, bags, ton, \$28.50 to \$30.00; French, ex-dock, to arrive, bags, ton, \$23.00 to \$25.00; ex-warehouse, bags, ton, \$27.50 to \$30.00; high grade, bags, ton, \$45.00 to \$60.00; Italian, ex-dock, to arrive, bags, ton, \$70.00 to \$85.00; ex-warehouse, bags, ton, \$75.00 to \$90.00. Asbestine (fibrous talc) type 1, 96-98% through 325 mesh, car lots, f.o.b. seller's works, bags, ton, \$14.00 to \$—; type 2, 93-94% through 325 mesh, car lots, f.o.b. seller's works, bags, ton, \$13.00 to \$—.

Canadian prices for talc as quoted for April, 1934, by "Canadian Chemistry and Metallurgy" were: Talc, car loads, AAIF grade, f.o.b. Madoc, ton, \$17.50; Talc, car loads, No. 1 grade, f.o.b. Madoc, ton, \$11.00; Talc, car loads, S. grade, f.o.b. Madoc, ton, \$8.00; Talc, imported, Italian, ton, \$75.00.

Table 251.—Capital Employed in the Talc and Soapstone Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	642,873	595,084
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	9,868	9,581
(c) Inventory value of finished products on hand.....	9,653	8,928
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	41,138	70,782
Total	703,532	684,375

Table 252.—Employees, Salaries and Wages in the Talc and Soapstone Industry in Canada, 1932 and 1933

	1932				1933			
	Number of employees		Total	Salaries and wages	Number of employees		Total	Salaries and wages
	Male	Female			Male	Female		
Salaries employees.....	6	2	8	\$ 20,422	8	2	10	\$ 24,096
Wage-earners.....	75	.....	75	56,155	93	.....	93	58,964
Total	81	2	83	76,577	101	2	103	83,060

Table 253.—Production of Talc and Soapstone in Canada, 1924-1933

(For the years 1888 to 1923 see Mineral Production of Canada 1928)

Year	Value	Year	Value
	\$		\$
1924.....	154,480	1929.....	229,198
1925.....	205,835	1930.....	186,216
1926.....	217,195	1931.....	157,083
1927.....	236,105	1932.....	159,038
1928.....	219,358	1933.....	190,836

Table 254.—Production in Canada, Imports and Exports of Talc and Soapstone, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION—						
Soapstone.....		34,439		46,751		47,680
Talc.....	11,836	122,644	12,103	112,287	15,181	143,156
Total.....		157,083		159,038		190,836
IMPORTS—						
Talc or soapstone, ground or unground..	2,670	49,452	1,900	49,774	2,150	48,650
EXPORTS—						
Talc.....	7,852	83,765	7,806	85,790	10,724	116,950

Table 255.—Consumption of Talc in Specified Canadian Industries, 1932 and 1933

Industry	1932		1933	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
Toilet Preparations Industry.....lb.	747,489	18,600	868,952	25,920
Soaps, Cleaning Preparations and Washing Compounds Industry...lb.	315,693	2,741	346,641	2,623
Roofing Materials Industry.....ton	1,129	12,922	1,180	12,928
Pulp and Paper Industry.....ton	213	3,761	1,024	18,862

Table 256.—World Production of Talc, 1931-1933

(Supplied by Imperial Institute.)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	160	258	166	Greece.....	476	608	(a)
Union of South Africa.....	210	265	276	Italy.....	37,800	31,860	33,908
Canada (sales) (c).....	10,568	10,806	13,554	Norway.....	11,212	13,322	19,571
India.....	5,135	6,512	17,048	Roumania (d).....	3,020	1,770	(a)
Australia.....	846	1,347	1,769	Spain (b).....	4,488	4,577	5,682
FOREIGN COUNTRIES				Sweden.....	4,662	4,454	4,630
Austria (estimated).....	25,000	25,000	25,000	Morocco (French) (exports)	682	824	518
Finland.....	3,000	1,599	(a)	United States (sales) (c)...	146,207	110,019	143,352
France.....	82,600	(a)	(a)	Uruguay (exports).....	1,761	2,584	1,250
Germany (Bavaria).....	4,142	3,147	(a)	Egypt.....		228	2,491
				Manchoukuo.....	42,213	43,616	61,444
				Argentina.....			20

Note—5,480 long tons of talc were recorded as produced in Russia during year ended September 1928—later figures are not available.

(a) Information not available.

(b) In addition the following were quarried, 2,038, 1,936 and 3,301 cubic yards in 1931, 1932 and 1933 respectively.

(c) Excluding steatite, figures of which are not available for publication.

(d) Converted from cubic metres at rate of 1 cubic metre equals 2 long tons.

(e) Excluding soapstone which is only recorded by value and was as follows:—

1931.....	£ 7,300
1932.....	£11,700
1933.....	£ 9,700

MISCELLANEOUS NON-METAL MINING INDUSTRIES

Included in this chapter are the following non-metallic minerals:

Actinolite	Manganese, bog
Barytes	Mineral waters
Bituminous sands	Natro-alunite
Fluorspar	Phosphate
Graphite	Pyrites
Lithium minerals	Silica brick
Magnesitic dolomite	Sodium carbonate
Magnesium sulphate	Sodium sulphate

Statistics relating to capital and labour are combined for these industries and are shown in Tables 256(a) and 257.

In addition to the foregoing, data are also shown for production, imports and exports of sulphuric acid and sulphur.

1933 statistics show a total combined value of \$1,420,319 for the Canadian production (sales) of miscellaneous non-metallic minerals, including actinolite, barytes, bituminous sands, fluorspar, graphite, magnesitic dolomite (magnesite), magnesium sulphate, bog manganese, mineral waters, peat, phosphate, silica brick, sodium carbonate, sodium sulphate and sulphur as compared with \$1,061,779 in 1932, or an increase of 33.8 per cent. Especially noteworthy were the increases recorded in the value of sales for magnesitic dolomite and sodium sulphate; the value in 1933 for the first product represents a gain of 37 per cent over 1932 while that for the latter realized a 78.6 per cent increase.

Table 256(a).—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1932 and 1933

	1932	1933
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	1,755,102	3,698,898
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	54,015	87,684
(c) Inventory value of finished products on hand.....	174,848	171,520
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	88,948	244,634
Total.....	2,072,913	4,202,736

Table 257.—Employees, Salaries and Wages in the Miscellaneous Non-Metal Mining Industries, 1932 and 1933

	1932				1933			
	Number of employees			Salaries and wages	Number of employees			Salaries and wages
	Male	Female	Total		Male	Female	Total	
Salaried employees.....	29	6	35	\$ 54,822	34	10	44	\$ 62,364
Wage-earners.....	147	.....	147	100,344	253	.....	253	179,635
Total.....	176	6	182	155,166	287	10	297	241,999

ACTINOLITE

Actinolite production in Canada has been restricted to the townships of Elzevir and Kaladar in Hastings and Addington counties, Ontario. There has been no production of this mineral in Canada since 1931 in which year the output totalled 35 tons valued at \$456. Actinolite is used chiefly in the manufacture of roofing materials.

Table 258.—Production of Actinolite in Canada, 1924-1933

(For production from 1897 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	90	1,225	1929.....	30	375
1925.....	40	500	1930.....	34	437
1926.....	80	1,000	1931.....	35	456
1927.....	86	1,075	1932.....		
1928.....	70	875	1933.....		

BARYTES

Deposits of barytes at Five Islands, Colchester county, and Brookfield, Hants county, Nova Scotia, were first operated between 1865 and 1870. These deposits have produced about 5,000 tons of barytes. The McKellar Island deposit in Thunder Bay District, Ontario, in the course of its operations produced several thousand tons of this mineral. Large deposits of barytes at Lake Ainslie, Cape Breton Island, were opened up in 1894. Between 1900 and 1903 the Cap Rouge deposit in North Cheticamp district was operated. In 1918 a deposit in Langmuir township, Ontario, was active and a mill for grinding and preparing barytes completed. Development work was done on the Bellow mine in North Burgess township, Ontario, in 1918. A deposit near Tionaga station was also operated in 1923 and 200 tons of barytes shipped.

Barytes production in Canada during the past came from deposits in Nova Scotia, Quebec and Ontario and during recent years more particularly from a property located at Lake Ainslie Nova Scotia. Production in 1933 totalled 20 tons valued at \$60; this came entirely from the Tionaga mine, Penhorwood township, Ontario. In Langmuir township, Ontario, Canada Night Hawk Mines, Ltd., conducted development work on a barytes deposit and reported mill operations of an experimental nature.

In the order of their importance the principal countries producing barium minerals are, normally, the United States, Germany, Great Britain and Italy.

Reports indicate, states the Department of Mines, Ottawa, that the amount of ground baryte, used as such for pigment loader and filler purposes in the paint, rubber, paper and other trades, has been steadily decreasing, a growing preference being shown for more efficient substitutes. A new technical development is the growing use of barium metal in the lamp, radio and spark plug field and the formation of a corporation in the United States to manufacture stainless steel using barium has recently been announced.

No exports of barytes were reported from Canada for either 1932 or 1933.

Barytes consumed in the Canadian paints, pigments and varnishes industry in 1933 amounted to 1,032 tons valued at \$35,138 compared with 1,031 tons worth \$33,578 in 1932.

Quotations in the United States at the close of 1933 for barium minerals were: Witherite (barium carbonate) per ton, 90 per cent, 300 mesh, \$40. Barytes, f.o.b. mines California, crude, \$6 per ton. Georgia, barytes ore crude, \$7 per long ton. Missouri, per ton, water ground and floated, bleached, \$23, carlots, f.o.b. works. Crude ore, minimum 95 per cent BaSO₄, less than 1 per cent iron, \$5; 1 per cent iron and 93 per cent BaSO₄, \$5; low grade, \$4.50, f.o.b. mines.

Table 259.—Production of Barytes in Canada, 1924-1933

(For the years 1885 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	150	3,308	1929.....	105	2,341
1925.....	91	2,259	1930.....	66	1,484
1926.....	105	2,307	1931.....	16	363
1927.....	56	1,268	1932.....		
1928.....	127	2,847	1933.....	20	60

Table 260.—Imports of Barytes and Barium Products into Canada, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Barium, peroxide of, non-alcoholic.....	3	624	2	461		
Blanc fixe.....	798	34,483	466	20,932	276	11,390
Barytes.....	1,686	32,712	1,292	22,989	1,587	28,255
Lithopone.....	6,931	660,037	8,055	585,148	5,694	406,598

BITUMINOUS SANDS

Production of bituminous sands in Canada in 1933 amounted to 466 tons valued at \$1,662 compared with 343 tons worth \$1,372 in 1932 and 1,015 tons at \$4,060 in 1931. The material as produced in Canada comes entirely from the Fort McMurray district of Northern Alberta. The principal products resulting from the commercial development of these deposits will probably be motor fuels, other liquid hydrocarbon compounds and certain solid products.

The widespread nature of these sands affords support for the view that they will, in due course, be of considerable economic importance.

Table 261.—Production of Bituminous Sands in Canada and Imports of Asphalt, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION—						
Bituminous sands.....	1,015	4,060	343	1,372	466	1,662
IMPORTS—						
Asphalt, solid.....	36,900	517,532	12,532	193,912	4,462	106,586
Asphalt, not solid.....		35,854		10,709		10,312
Asphaltum oil for paving purposes.....		45,557		8,887		1,458
Total.....		598,943		213,508		118,356

FLUORSPAR

Canadian mine shipments of fluorspar in 1933 amounted to 73 tons valued at \$1,064 compared with 32 tons worth \$464 in 1932 and 40 tons at \$620 in 1931. Production in all of the three years came from the Madoc area, Hastings county, Ontario. The mineral has also been mined in British Columbia by the Consolidated Mining and Smelting Company of Canada. Fluorspar is used chiefly in the manufacture of glass, enamel and vitrolite, hydrofluoric acid and derivatives and in smelting plants and foundries.

Fluorspar imports into Canada in 1933 totalled 44,388 cwt. valued at \$21,165 compared with 20,188 cwt. at \$22,965 in 1932.

The more important fluorspar producing countries include the United Kingdom, France, United States, Germany, Italy and China.

Fluorspar shipped from United States mines was used in the United States as follows:—

Use	1932		1933	
	Short tons	\$	Short tons	\$
Steel.....	18,881	228,933	60,279	769,889
Foundry.....	524	7,636	1,039	13,791
Glass.....	3,596	101,765	6,778	147,985
Enamel and vitrolite.....	1,261	36,318	3,100	76,932
Hydrofluoric acid and derivatives.....	738	14,603	950	18,604
Miscellaneous.....	226	2,691	713	11,010
Total.....	25,226	391,946	72,859	1,038,211

Fluorspar prices in the United States at the end of 1933 were: per net ton, 85 per cent CaF_2 and not over 5 per cent SiO_2 , Kentucky and Illinois mines: washed gravel, \$15; No. 2 lump, \$15.50. Ground fluorspar, f.o.b. Illinois mines, 95 to 98 per cent CaF_2 and not over $2\frac{1}{2}$ per cent SiO_2 , \$30 in bulk; \$34 in bags or barrels. Foreign fluorspar, gravel 85-5 \$20.25 to \$20.75 per gross ton, duty paid, Baltimore or Philadelphia.

Table 262.—Production of Fluorspar in Canada, by Provinces, 1924-1933

(For the years 1905 to 1923 see Mineral Production of Canada, 1928)

	Ontario		British Columbia		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1924.....	76	1,343			76	1,343
1925.....	12	200	3,874	19,034	3,886	19,234
1926-1928.....						
1929.....	70	1,120	17,800	267,000	17,870	268,120
1930.....	80	1,240			80	1,240
1931.....	40	620			40	620
1932.....	32	464			32	464
1933.....	73	1,064			73	1,064

GRAPHITE

In 1933 production of Canadian graphite totalled 405 tons compared with 346 tons in 1932. The 1933 output came chiefly from the Black Donald mine, Renfrew county, Ontario, while smaller shipments were made from the province of Quebec.

The general world industrial depression with a declining demand for graphite and resultant lower prices seriously affected mining operations in most of the graphite producing countries. Canada has produced both flake and amorphous graphite and in the Black Donald mine in Renfrew county, Ontario, the Dominion possesses one of the largest graphite deposits in the world. Important graphite properties have also been operated in the province of Quebec.

Development work was conducted both in 1931 and 1932 on deposits of amorphous graphite located near Glendale, Inverness county, Nova Scotia; the mineral occurs in an impure crystalline limestone.

Some of the more important graphite producing countries are Germany, Korea, Austria, Madagascar, Ceylon, Italy and Mexico.

The world consumption of graphite has been estimated at approximately 20 per cent for crucibles, 40 per cent for foundry work, 15 per cent for paints, 7 per cent for electrical conductors, 7 per cent for lubricants, 5 per cent for electric batteries, 4 per cent for crayons and 2 per cent for miscellaneous purposes.

Graphite prices, December, 1933, were: per pound, f.o.b. New York: Ceylon lump, 6½ to 7½ cents; carbon lump, 3 to 6 cents; chip, 5 to 6 cents; dust, 3 to 4 cents; Madagascar flake, 5 to 6 cents. No. 1 flake, 8 to 16 cents; No. 2, 5½ cents upward; fine ground, 55 to 70 per cent carbon, 3 cents upwards; amorphous, 3 cents upwards. Crude amorphous graphite, \$12 to \$23 per ton, according to grade.

Table 263.—Production of Graphite in Canada, by Provinces, 1924-1933

(For production from 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1924.....	46	3,275	1,288	72,842	1,334	76,117
1925.....	359	30,900	2,210	127,863	2,569	158,763
1926.....	326	29,516	2,401	165,344	2,727	194,860
1927.....	34	2,043	1,795	109,613	1,829	111,656
1928.....	50	4,668	1,047	52,373	1,097	57,041
1929.....	173	12,652	1,288	90,522	1,461	103,174
1930.....	197	9,850	1,338	86,542	1,535	96,392
1931.....			548	32,149	548	32,149
1932.....			346	18,483	346	18,483
1933.....	43	2,222	362	16,145	405	18,367

Table 264.—Production in Canada, Imports and Exports of Graphite, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Ore milled.....	924		1,424		1,234	
Production.....	548	32,149	346	18,483	405	18,367
IMPORTS—						
Crucibles, plumbago.....		34,215		29,909		26,521
Plumbago, not ground or otherwise manufactured.....		1,404		1,869		4,729
Plumbago, ground and manufactures of, n.o.p.....		81,233		70,565		69,003
EXPORTS—						
Graphite or plumbago, crude or refined..	951	44,606	907	41,146	987	40,115
Carbon and graphite electrodes.....		154,470		217,732		305,607

Table 265.—World Production of Graphite, 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
Canada (sales).....	489	309	362	Italy.....	3,986	2,898	3,149
Australia.....	60	70	30	Norway.....	(c) 863	661	1,951
Ceylon (exports).....	6,721	6,100	9,559	Japan.....	290	487	865
Union of South Africa.....	43	49	58	Korea.....	13,000	16,548	22,318
India.....	7	5		Madagascar.....	4,613	2,691	(a)
FOREIGN COUNTRIES				Morocco (French zone).....		236	(a)
Austria (crude).....	11,869	10,431	14,537	Mexico.....	3,073	2,013	2,643
Brazil (exports).....	9		1				
Czechoslovakia.....	1,801	907	120				
Germany.....	23,199	20,479	19,443				

NOTE.—Graphite is also produced in U.S.S.R. (Russia) and the United States, but figures are not available.

(a) Information not available.

(c) Crude.

LITHIUM MINERALS

Lithium-bearing minerals are reported to occur in commercial quantities at Lac du Bonnet in southeastern Manitoba. Shipments have been made from these deposits for experimental purposes. No production of lithium ores was recorded in Canada for 1933.

There is no present market in Canada for lithium ores; so, unless an extraction plant for the recovery of lithia salts is erected, any production will have to find a market either in the United States or Europe. The American market is at present adequately supplied from the large deposits in South Dakota and California.

The principal use of lepidolite, as such, is in the glass industry, as an ingredient of heat-resistant, flint and opal glasses. Its lithia content being low in comparison with that of spodumene and amblygonite, the latter minerals are usually preferred as raw material for the manufacture of lithia salts and chemicals. The recent development in Germany, however, of a process whereby lithia mica (zinnwaldite) is decomposed by heating with potassium sulphate, has resulted in the establishment of an important industry in that country. Products made are lithium salts and the metal. Increasing amounts of metallic lithium are now being used, recent research having shown that it possesses valuable properties both as an alloy and for the de-gassing of copper.

Reports state that there was a marked decline during the year in the price quotations in the United States for lithium minerals, lepidolite dropping from \$50 to \$20 per ton, and amblygonite from \$50 to \$35.

A report containing a section on the lithium deposits of Manitoba (Memoir No. 169) was published by the Geological Survey, Department of Mines of Canada, in 1932.

MAGNESITIC DOLOMITE AND MAGNESITE

Production of calcined and dead-burned magnesitic dolomite in Canada during 1933 amounted in value to \$360,128 compared with \$262,860 in 1932, or an increase of 37 per cent. The production of this material in Canada is confined to the townships of Harrington and Grenville along the north shore of the Ottawa river, some sixty miles west of Montreal.

Large deposits of siliceous magnesite were discovered in 1932 in the Cranbrook area of British Columbia but no development of these was reported in 1933.

Some development work was conducted in 1933 by Consolidated Mining and Smelting Company of Canada, Ltd., on magnesite occurring at Marysville in the Fort Steele M.D. British Columbia.

The Department of Mines, Ottawa, reports that the recent trend in the making of magnesia products has been largely toward the production of highly refractory materials such as are used for lining the bottoms of steel furnaces. Finely ground refractory cement is also a recent product. Caustic-calcined magnesia is being used for the construction of floors and for floor tiles.

Imports of magnesite, dead-burned, sintered, caustic calcined or plastic magnesia totalled 28,053 cwt. valued at \$43,229 in 1933 compared with 21,302 cwt. at \$28,626 in 1932. Magnesite fire brick imports in 1933 were appraised at \$246,855; similar imports in the preceding year were valued at \$71,077.

Exports of magnesite, calcined, dead-burned, etc., totalled 46,396 cwt. worth \$63,056 in 1933 as against 23,885 cwt. valued at \$33,103 in 1932.

Russia, the United States, Austria, China, Czechoslovakia, Greece, Canada, Yugoslavia and India are the more important magnesite producing countries.

Magnesite prices in the United States, December, 1933, were quoted as follows: per ton, f.o.b. California dead-burned, \$28. Artificial periclase 94 per cent MgO, \$65. Caustic, 95 per cent MgO, white colour, \$40; 90 per cent MgO, no colour standard, \$37.50. Washington: dead-burned grain magnesite, \$22.

Table 266.—Production of Magnesite* in Canada, 1924-1933

(For the years 1908 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	3,873	101,356	1929.....	18,809	491,170
1925.....	5,576	122,325	1930.....	13,336	336,162
1926.....	4,571	137,431	1931.....	11,411	295,579
1927.....	7,337	230,309	1932.....	†	262,860
1928.....	13,195	346,990	1933.....	†	360,128

*Magnesitic dolomite.

†Owing to the limited number of firms, the data relating to quantity are not published.

Table 267.—Production in Canada, Imports and Exports of Magnesite*, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Crude, mined.....	26,839		3,123		29,937	
Crude, calcined or treated.....	22,544		17,883		24,837	
PRODUCTION—Calcined and dead-burned.....	11,411	295,579	(d)	262,860	(d)	360,128
IMPORTS—						
Magnesia pipe covering.....		126,210		64,924		35,062
Magnesite (crude rock).....						
Magnesite firebrick.....		152,435		71,077		246,855
Magnesite, dead-burned, sintered, caustic, calcined or plastic magnesia.....	1,787	40,628	1,065	28,626	1,403	43,229
EXPORTS—						
Magnesite, calcined or dead-burned.....	1,610	45,257	1,194	33,103	2,320	63,056

* Including magnesitic dolomite.

(d) Not available for publication.

Table 268.—World Production of Magnesite, 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country and description	1931	1932	1933	Country and description	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
Union of South Africa—				Italy—			
Crude magnesite.....	1,336	1,396	1,471	Crude magnesite.....	3,415	453	(a)
Canada—				Yugoslavia (Serbia only)—			
Crude magnesite.....	23,963	2,788	(a)	Crude magnesite.....	22,826	16,084	14,371
Caustic and dead-burnt(c)	10,188	7,939	(a)	Calcined magnesite.....	8,875	7,633	5,561
India—				Norway—			
Crude magnesite.....	5,333	13,864	15,206	Crude.....	1,555	1,290	1,975
Australia—				Calcined magnesite (c).....	450	512	579
Crude magnesite.....	3,475	5,391	9,720	Magnesia bricks (c).....	290	537	483
Southern Rhodesia—				U.S.S.R. (Russia) —(years			
Crude.....		13		ended Sept. 30)—			
				Crude magnesite.....	242,000		
FOREIGN COUNTRIES				Caustic magnesia (c).....	13,665	(a)	(a)
Austria—				Dead-burned magnesia (c)	51,700		
Crude magnesite.....	176,606	132,286	161,736	Magnesia bricks (c).....	29,904		
Caustic magnesia (c).....	34,211	30,412	23,462	United States—			
Dead-burned magnesia (c)	38,186	28,298	63,260	Crude magnesite.....	65,716	34,341	96,596
Bricks (c).....	23,441	15,283	24,970	Caustic (sales) (c).....	5,268	3,013	7,269
Czechoslovakia—				Dead-burned (sales) (c)...	25,206	13,246	38,940
Calcined magnesite (b)...	14,569	13,014	18,988	Turkey—			
Greece—				Crude magnesite.....	2,162	305	936
Crude magnesite.....	49,200	43,993	(a)	Manchoukuo—			
Caustic magnesia (c).....	12,764	9,047		Crude magnesite.....	35,465	54,511	70,249
Dead-burned magnesia (c)	1,886	1,605					

(a) Information not available.

(b) Exports less imports.

(c) Derived from crude shown, and not additional.

MAGNESIUM SULPHATE

In 1915 work commenced on the Spotted Lake deposit of magnesium sulphate near Kruger Mountain, Osoyoos division, British Columbia. Shipments were made of this material to the drug trade during 1915 and 1916. Crude magnesium sulphate to a total of 2,600 tons was extracted in 1917 of which quantity 929 tons were shipped to Oroville, Washington. The following year a deposit near Clinton, Lillooet division, was also operated. Preliminary shipments were made in 1920 from several lakes containing these salts, on the Basque ranch, near Ashcroft, British Columbia.

The total 1933 Canadian output of magnesium sulphate totalling 120 tons with a value of \$3,360 came from the deposit at Basque, British Columbia. This deposit not worked since 1923 was operated in a small way during 1933. The mineral was treated in an experimental mill erected at Ashcroft.

Experiments have recently been carried out by the National Research Council, Ottawa, for the recovery of magnesium sulphate from the waste material from asbestos recovery in the province of Quebec.

The greater part of the imports of this material is used for industrial purposes, the tanning industry taking the larger proportion. About 20 per cent goes to the drug trade.

Imports of magnesium sulphate or Epsom salts into Canada during 1933 totalled 4,269,852 pounds valued at \$49,868 compared with 4,383,115 pounds at \$47,679 in 1932.

Epsom salt prices were quoted October 1st, 1934, f.o.b. New York, domestic, technical, 100 pound bags, \$2.10; imported v.s.p. barrels, kegs, 100 pounds, \$2.25 to \$2.50.

For annual productions from 1917 to 1923 see Mineral Production of Canada annual report for 1930.

MANGANESE, BOG

Bog manganese consists mainly of oxide of manganese and water, with some oxide of iron, and often silica, alumina and baryta. Shipments of bog manganese from Dawson Settlement, Albert county, New Brunswick, during 1931 amounted to 77 tons valued at \$462 and constituted the total Canadian production of this material for that year; the New Brunswick property was inactive throughout 1933 and no sales of bog manganese were reported anywhere in the Dominion since 1931. The material is utilized principally in the ceramic industry.

Imports of manganese oxide into Canada during 1933 amounted to 686,842 cwt. valued at \$293,910 compared with 30,249 cwt. worth \$87,644 in 1932.

MINERAL WATERS

A record of all the natural mineral waters produced in Canada and sold to the general public for medicinal purposes since 1888 has been compiled. In that year 124,850 gallons were produced and during the following ten years production varied between 424,600 gallons and 767,460 gallons. Only the value of shipments were recorded from 1899 to 1920; the high mark for the industry was reached in 1911 when the production was valued at \$223,758.

Sales of natural mineral waters produced from Canadian springs totalled 38,818 imperial gallons valued at \$5,441 in 1933 compared with 76,714 imperial gallons worth \$7,170 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec the Abenakis springs on the St. François river in Yamaska county; Potton springs in Brome county and the Coulombia spring at L'Épiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot springs in the Fraser Valley and the Halcyon Hot springs on Arrow Lake are noted for their curative properties.

Imports of natural mineral waters, not in bottles, amounted to 45 gallons valued at \$40 in 1933 compared with 947 gallons at \$1,286 in 1932. Mineral and aerated waters, n.o.p., imported totalled \$75,242 as against \$105,547 in 1932.

Exports of mineral and aerated waters totalled in value \$5,572, in 1933, compared with \$7,361 in 1932.

Table 269.—Production of Mineral Waters in Canada, 1924-1933

(For the years 1888 to 1923 see Mineral Production of Canada, 1928)

Year	Imp. gal.	Value	Year	Imp. gal.	Value
		\$			\$
1924.....	209,353	15,421	1929.....	321,905	16,139
1925.....	190,134	28,413	1930.....	227,141	24,481
1926.....	215,356	29,721	1931.....	217,408	13,234
1927.....	303,530	14,624	1932.....	76,714	7,170
1928.....	269,045	33,498	1933.....	38,818	5,441

Table 270.—Production in Canada, Imports and Exports of Mineral Waters, 1931-1933

	1931		1932		1933	
	Imp. gal.	Value	Imp. gal.	Value	Imp. gal.	Value
		\$		\$		\$
PRODUCTION, by provinces—						
Quebec.....	19,868	4,746	15,506	4,697	9,024	3,094
Ontario.....	197,540	8,578	61,208	2,473	29,794	2,347
Total.....	217,408	13,324	76,714	7,170	38,818	5,441
IMPORTS—Mineral and aerated waters.....		154,971		110,040		77,552
EXPORTS—Mineral and aerated waters.....		13,411		7,361		5,572

PHOSPHATE

The existence of the extensive Lièvre river deposits of crystalline phosphate lime or apatite was first noted in 1829. However, the first commercial shipments of this mineral in Canada were made between 1870 and 1877 from North Burgess township, Ontario, to a superphosphate plant at Brockville. An active market was open in Europe for raw phosphate for fertilizer purposes and this added impetus to the mining of phosphate in Ontario and Quebec. From 1878 to 1892 inclusive, the industry in Canada was at its highest point, and 296,695 tons were produced. Exports during this 15-year period totalled 281,329 tons of which quantity Great Britain received approximately 86 per cent; the United States, 8 per cent; Germany, 5 per cent; and France, Denmark, Spain and Holland, the remainder. The maximum shipment of 31,753 tons was made in 1890. Since 1899, however, the annual production has exceeded the 1,500 ton mark only once.

The discovery and opening up in the United States of the large phosphate deposits in Florida in the nineties and later of those in Tennessee, the western states and Africa, caused a sharp falling-off in prices for phosphate and resulted in the closing of the large Canadian mines.

The production of Canadian phosphate since 1895 has been mainly obtained as a by-product in the mining of mica. Activity in the phosphate industry in Canada has been practically negligible for a number of years.

Shipments of phosphate in Canada during 1933 totalled 2,214 tons valued at \$5,475 compared with 1,316 tons at \$12,333 in 1932. Production in 1932 consisted entirely of apatite mined in the Buckingham district of the province of Quebec whereas in 1933 the output comprised not only shipments of Quebec apatite but rock phosphate mined at Fernie and Crownsnest, B.C., by the Consolidated Mining and Smelting Company of Canada, Ltd. The apatite production in Quebec was utilized in an electro-chemical plant while the rock phosphate was employed in the manufacture of fertilizer at Trail, British Columbia.

Imports of phosphate rock (fertilizer) during 1933 totalled 367,020 tons worth \$74,527 compared with 1,428,657 tons at \$346,907 in 1932; of the 1932 imports, 1,132,452 tons came from the United States and the balance from Morocco, in 1933 the mineral came entirely from the United States.

Acid phosphate (not medicinal) imports in 1933 amounted to 2,480,351 pounds worth \$192,213 compared with 2,773,873 pounds at \$226,136 in 1932. Soda phosphate imports totalled 5,897,653 pounds valued at \$156,204 in 1933; corresponding imports in the previous year were 7,110,322 pounds at \$202,746.

September, 1934, quotations for phosphate per long ton f.o.b. mines, were: Florida pebble, for export: 76 to 77 per cent, \$7.25; 75 per cent, \$6.50; 68 per cent, \$4.50. Florida pebble, domestic, 76 to 77 per cent, \$6.15; 74 to 75 per cent, \$5; 70 per cent, \$3.75. Tennessee, ground lime phosphate, 85 per cent through 300 mesh, 33 per cent P_2O_5 , \$9 per net ton, bags extra. Algeria-Tunis, 58-63 per cent, f.o.b. 1.20 francs per unit, 65-70 per cent 1.45 francs per unit. Morocco, 75-77 per cent f.o.b. Casablanca, 140 francs per ton.

Table 271.—Production of Phosphate in Canada, by Provinces, 1924-1933

(For the years 1870 to 1923 see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1924.....						
1925.....	16	189			16	189
1926.....	40	800			40	800
1927.....	31	399	82	824	(a) 151	1,717
1928.....	91	1,126			(b) 641	8,276
1929.....	40	800			(c) 1,185	5,380
1930.....	40	760			40	760
1931.....						
1932.....	1,316	12,333			1,316	12,333
1933.....	105	805			(d) 2,214	5,475

(a) Includes 38 tons valued at \$494 shipped from British Columbia deposits.

(b) Includes 550 tons valued at \$7,150 shipped from British Columbia deposits.

(c) Includes 1,145 tons valued at \$4,580 shipped from British Columbia deposits.

(d) Includes 2,109 tons valued at \$4,670 shipped from British Columbia deposits.

Table 272.—Production in Canada, Imports and Exports of Phosphate, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION.....			1,316	12,333	2,214	5,475
IMPORTS—						
Phosphate rock.....	141,722	619,079	71,433	346,907	18,351	74,527
Acid phosphate (not medicinal).....	1,278	188,884	1,387	226,136	1,241	192,213
Phosphorus and compounds, n.o.p.....	49	36,539	160	32,888	656	45,515
Superphosphate or acid phosphate of lime..	98,048	936,357	60,699	532,799	54,437	503,474
Soda Phosphate.....	3,836	203,789	3,555	202,476	2,949	156,204
EXPORTS—Phosphate rock.....						

Table 273.—World Production of Phosphate-Rock

(Supplied by Imperial Institute)

(Long tons)

Producing country	1931	1932	1933
BRITISH EMPIRE			
Seychelles (exports).....	4,655	13,989	12,113
Union of South Africa.....	1,876	1,164	1,163
Canada.....		1,175	1,977
India.....	109	121	37
Christmas Island.....	65,849	84,197	91,280
Australia.....	609	869	96
Nauru Island.....	245,165	418,185	363,680
Ocean Island.....	130,450	196,875	185,575
Total.....	449,000	717,000	656,000
FOREIGN COUNTRIES			
Belgium (b).....	48,325	25,402	(a)
Estonia.....	4,508	1,115	8,809
France.....	106,275	81,400	(a)
Poland.....	5,000	(a)	6,250
Spain.....	7,612	9,822	14,278
U.S.S.R. (Russia) (estimated).....	400,000	600,000	700,000
Algeria.....	555,976	560,288	578,470
Egypt.....	252,952	344,256	433,673
Madagascar.....	8,000	7,012	12,903
Morocco (French zone).....	925,769	988,162	1,048,822
Tunis.....	2,114,000	1,651,000	1,780,000
Netherlands West Indies (exports).....	79,650	61,421	82,895
United States.....	2,577,535	1,739,197	2,309,269
French Indo-China.....	12,668	400	
China.....	8,000	8,000	(a)
Japan.....	20,814	18,461	34,193
Netherlands East Indies.....	108	2,681	7,803
Philippine Islands.....	256	(a)	(a)
Angaur Island (exports).....	44,683	54,347	73,250
Makatea.....	137,000	118,745	77,797
New Caledonia.....		1,000	
Total.....	7,300,000	6,300,000	7,300,000
World's Total.....	7,800,000	7,000,000	8,000,000

(a) Information not available.

(b) In addition phosphatic chalk was produced as follows:—

1931.....	36,425 long tons
1932.....	51,570 "

POTASH

Natural potash salts are not yet mined or recovered on an extensive commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland county N.S., and at Gautreau, Westmorland county, N.B. A search for beds of economic importance has been made and results so far obtained have been sufficiently promising to warrant future work.

Potassium chloride so far opened up at Malagash occurs in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite. Small shipments of potash-bearing salt have been made recently from the Malagash deposit; this salt was employed as a fertilizer.

Imports of kainite and other German potash salts into Canada during 1933 totalled 4,189 short tons valued at \$71,340 as compared with 4,352 tons worth \$69,035 in 1932; 14,018 tons of crude muriate of potash valued at \$497,890 were imported in 1933 as against 14,661 tons at \$477,397 in 1932; sulphate of potash imports in 1933 totalled 2,446 tons with a value of \$103,202 in 1932, the tonnage was 1,345 and the value, \$57,132.

Natro-Alunite.—Natro-alunite occurs at Easy Cove in the Kyuquot section, Quatsino mining division, British Columbia. Small shipments of this mineral have been made from the deposit; the property has been inactive since 1927 when an endeavour was made to develop a trade demand for this product, utilizing its potash content as a fertilizer. For historical tables showing production from this deposit see annual report on Mineral Production of Canada for 1930.

Potash Salts Used in the Manufacture of Canadian Mixed Fertilizers, 1932 and 1933

	1932		1933	
	Tons	Cost at works	Tons	Cost at works
Kainite and potash manure salts.....	4,152	\$ 74,711	4,914	\$ 92,422
Muriate of potash.....	7,876	287,443	8,320	322,439
Sulphate of potash.....	1,366	54,821	1,015	63,184

Table 274.—World Production of Potash Minerals, 1931-1933

(Supplied by *Imperial Institute.*)

(Long tons.)

Country and description	Potash minerals			K ₂ O content or equivalent		
	1931	1932	1933	1931	1932	1933
BRITISH EMPIRE						
Palestine—						
Carnallite.....	40,000	10,000	(a)	(a)	5,000	(a)
India—						
Nitrate (estimated).....	7,000	9,000	10,000	3,400	4,300	4,800
Total (estimated).....				(a)	9,300	(a)
FOREIGN COUNTRIES						
France— (c)						
K ₂ O Equivalent, Sylvinite, etc.—						
12-16%.....	118,124	102,213	131,015	362,070	316,155	321,353
18-22%.....	446,210	388,361	497,692			
30-40%.....	142,070	94,849	122,277			
50% and over.....	363,605	337,324	284,039			
Germany—						
Kainite, Sylvinite, etc.....	6,881,691	5,688,310	6,614,188	961,232	797,314	945,654
Carnallite, etc.....	1,042,548	625,896	(a)	99,390	60,278	64,254
Italy—						
Leucite.....	16,000	43,000		(a)	(a)	
Alunite.....	974	700	526	100	70	50
Poland—						
Kainite.....	58,186	44,108	61,549	6,500	4,900	6,869
Sylvite.....	199,006	249,996	232,870	59,200	74,400	69,279
Spain—						
Chlorides, etc.....	84,470	99,776	238,660	27,672	53,945	89,674
Nitrified earth.....	1,083	738	500	(a)	(a)	(a)
United States—						
Crude salts.....	119,571	127,786	297,420	57,036	55,348	128,016
Korea—						
Alunite (impure).....	13,600	16,062	26,790	(a)	(a)	(a)
Egypt—						
Crude salts.....	1	8	4		(a)	(a)
Total.....				1,570,000	1,360,000	
World's total.....				1,570,000	1,370,000	

(a) Information not available.

(b) Sales.

(c) Crude salts mined were as follows:—1931-2, 162,000 long tons.

PYRITES

Census returns for 1871 record a production of 2,800 tons of pyrites in Canada, made up of 2,300 tons from Quebec deposits and 500 tons from Ontario. However, it is only since 1886 that a continuous official record of pyrites production is available. Customs' records for the period 1881 to 1885 inclusive, show exports of 120,126 tons of pyrites to the United States. The 1886 output of pyrites was 42,906 tons, all of which was obtained from the Albert and Crown mines, Sherbrooke county, Quebec. In 1889, the production totalled 72,225 tons; shipments ranged from 27,687 tons to 158,566 tons during the following 24 years. The war years, 1914-1918, brought about an increased demand for sulphuric acid and a consequent advance in the production of pyrites. Shipments during this period reached a grand total of 1.6 million tons or approximately 46 per cent of the total Canadian production from 1886 to 1927.

It has been the practice of the Bureau in past years to report export shipments of pyrites in terms of the sulphur content of the pyrites. In view of the fact that there is now an important production of sulphur in the form of sulphuric acid made from waste bessemer gases, it has been decided to modify the method of reporting production to show the total sulphur content of the pyrites shipped and in bessemer gases used in the manufacture of sulphuric acid.

The sulphur content of pyrites shipped and of waste smelter gases used in the manufacture of sulphuric acid amounted in 1933 to 57,373 tons valued at \$510,299 as against 53,172 tons at \$470,014 in 1932, an increase of 8 per cent in quantity and 8.6 per cent in value.

Sulphur employed in the manufacture of sulphuric acid was recovered from salvaged smelter gases in Ontario and British Columbia. In the former province Canadian Industries Limited continued the operation of their acid plant at Copper Cliff, Ontario, using sulphur gases from the International Nickel Company's smelter while in British Columbia the Consolidated Mining and Smelting Company of Canada, Ltd., manufactured sulphuric acid through the treatment of gases at the Trail metallurgical plants. This latter company reports an advance towards the economic recovery of sulphur dioxide from gases carrying low concentrations of that gas. A three-ton-a-day unit was under construction in 1933; this plant is expected to yield three tons of elemental sulphur and six tons of ammonium sulphate per day from gases containing about six-tenths of one per cent of sulphur dioxide.

In Boischatel township, Quebec, Aldermac Mines Limited produced both copper and iron pyrites concentrates, the copper concentrates going to the Noranda smelter; no shipments of iron pyrites were reported in 1933. Iron pyrites concentrates continued to be produced at Eustis, Quebec, by the Consolidated Copper and Sulphur Co. Ltd.; these were exported to the United States. At Britannia Beach in British Columbia the Britannia Mining and Smelting Company Limited shipped pyrites concentrates to United States smelting plants for fluxing purposes and to a Canadian plant for the manufacture of sulphuric acid.

No imports of pyrites into Canada were reported for either 1932 or 1933. Sulphur contained in pyrites exported from Canada in 1933 totalled 15,347 tons valued at \$121,280 compared with 17,455 tons at \$89,568 in 1932; these went entirely to either the United States or Japan. Imports of sulphuric acid in 1933 amounted to 116,174 pounds valued at \$8,493 compared with 124,931 pounds at \$9,543 in 1932. Sulphur and brimstone imports totalled 2,816,202 cwt. valued at \$2,529,920 in 1933 as against 2,099,895 cwt. at \$2,023,085 in 1932.

Pyrites was quoted September, 1934: per long ton unit of sulphur, c.i.f. United States ports, guaranteed 48 per cent sulphur, Spanish 12 to 12½ cents, nominal. Sulphur: per long ton for domestic market, \$18 f.o.b. Texas mines.

Table 275.—Production of †Pyrites in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Pyrites	Sulphur content	Value	Year	Pyrites	Sulphur content	Value
	tons	tons	\$		tons	tons	\$
1924.....	23,552	9,742	95,620	1929.....		42,781	350,843
1925.....	15,605	7,587	58,899	1930.....		37,730	314,835
1926.....	17,845	8,975	63,899	1931.....		50,107	429,457
1927.....	50,863	25,229	198,388	1932.....		53,172	470,014
1928.....	68,836	38,589	321,033	1933.....		57,373	510,299

†Since 1928 includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making.

Table 276.—Production in Canada, Imports and Exports of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid Made from Smelter Gases, 1932 and 1933

	Pyrites*			Smelter gas		Total sulphur	
	Sales Tons	Sulphur content		Sulphur content		Tons	Value
		Tons	Value	Tons	Value		
			\$		\$		\$
1932							
Quebec.....	36,249	17,954	133,838			17,954	133,838
Ontario.....				3,332	33,320	3,332	33,320
British Columbia.....	15,800	8,002	64,016	23,884	238,840	31,886	302,856
Canada.....	52,049	25,956	197,854	27,216	272,160	53,172	470,014
1933							
Quebec.....	39,320	19,167	146,261			19,167	146,261
Ontario.....				8,196	81,960	8,196	81,960
British Columbia.....	19,284	9,011	72,088	20,999	209,990	30,010	282,078
Canada.....	58,604	28,178	218,349	29,195	291,950	57,373	510,299

	1932		1933	
	Tons	\$	Tons	\$
IMPORTS—				
Brimstone or sulphur, crude or in roll or flour.....	104,995	2,023,085	140,810	2,529,920
EXPORTS—				
Sulphur contained in pyrites.....	17,455	89,568	15,347	121,280
Sulphuric acid.....	721	10,287	1,013	17,552

*Includes iron pyrites concentrates made from copper ores.

Table 277.—World Production of Pyrites (*) (Including Cupreous Pyrites), 1931-1933

(Supplied by *Imperial Institute*)

(Long tons)

Country	Pyrites			Estimated sulphur content		
	1931	1932	1933	1931	1932	1933
BRITISH EMPIRE						
United Kingdom.....	1,979	992	1,132	(a)	(a)	(a)
Union of South Africa.....	3,708	3,382	3,606	(a)	(a)	(a)
Canada (c).....	56,512	46,464	52,321	23,367	23,175	(a)
Cyprus.....	193,845	161,172	211,613	96,923	80,586	105,807
Australia.....	507	274	1,498	(a)	(a)	(a)
Southern Rhodesia.....		268	10,905		100	4,400
Total.....	257,000	213,000	281,000			
FOREIGN COUNTRIES						
Czechoslovakia.....	20,367	15,393	15,182	8,045	6,465	6,377
France.....	189,684	187,743	165,762	86,727	86,400	76,000
Germany.....	220,459	172,449	186,652	95,025	74,154	(a)
Greece.....	139,208	85,397	(a)	66,292	41,502	(a)
Italy.....	635,560	508,796	712,271	295,662	233,944	331,000
Yugoslavia.....	29,064	15,470	17,489	12,000	6,400	7,300
Norway.....	364,266	715,538	850,921	157,544	313,951	376,692
Poland.....	3,534		(a)	1,500		(a)
Portugal.....	282,671	234,116	207,333	130,000	110,000	100,000
Roumania.....	24,650	5,543	13,725	10,300	2,305	5,800
Spain.....	2,552,965	2,091,761	2,183,866	1,240,000	1,200,000	(a)
Sweden.....	56,699	70,404	84,932	22,429	27,521	32,960
Algeria.....	21,467	20,825	15,836	9,600	9,600	7,400
United States (b).....	330,845	189,703	284,311	121,503	66,432	107,778
Japan.....	551,522	714,606	888,865	220,000	290,000	(a)
Korea.....		7,017	14,289		(a)	(a)
Manchoukuo.....	3,857	3,563	(a)	1,400	1,300	(a)
Total (d).....	5,400,000	5,000,000	5,700,000			
World's total (d).....	5,700,000	5,200,000	6,000,000			

(a) Information not available.

(b) Includes by-product Pyrite from zinc operations in Wisconsin and New York, and Pyrite and Pyrrhotite concentrates from copper operations in Tennessee.

(c) Includes Pyrite ore also concentrates made from copper ores.

(d) Excluding U.S.S.R. (Russia).

(*) See also Sulphur (Table 278).

Table 278.—World Production of Sulphur, (*) 1931-1933

(Supplied by Imperial Institute)

(Long tons)

Country and description	1931	1932	1933	Country and description	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom and Irish Free State—				Ecuador—			
Spent oxide (b).....	124,200	129,000	132,700	Sulphur rock.....	150		
Southern Rhodesia—				Spain—			
Sulphur.....	100			Sulphur rock.....	64,284	52,423	53,184
Canada—				Refined sulphur (d).....	21,155	17,151	37,871
Smelters gas (e).....	16,371	24,300	(a)	Sulphur recovered from pyrites.....		4,500	(a)
FOREIGN COUNTRIES				United States—			
Germany (h).....	12,000	12,000	12,000	Crude sulphur.....	2,128,930	890,440	1,406,063
Greece—				Sulphur ore.....	(a)	100	
Sulphur rock.....	5,312		(a)	Slurry (f).....	2,500	2,500	(a)
Refined sulphur (c).....	368	300	(a)	Smelters gas (g).....	220,000	220,000	(a)
Italy—				Chile—			
Sulphur ore.....	2,145,119	2,127,000	2,283,381	Sulphur.....	5,018	11,770	12,557
Crude sulphur—(c)				China— (estimated)			
Fused.....	347,372	344,449	370,675	Sulphur.....	5,578	6,000	6,000
Ground.....	19,502	25,119	24,569	Formosa—			
Norway—				Sulphur.....	779	544	(a)
Sulphur recovered from pyrites.....	8,403	60,000	(a)	Japan—			
France—				Sulphur rock.....	2,195	2,591	2,657
Sulphur Rock.....	504	(a)	(a)	Refined sulphur.....	60,528	83,185	112,619
Sweden—				Netherlands and East Indies—			
Sulphur.....	-	-	624	Sulphur.....	1,788	7,517	11,036
				Turkey			
				Sulphur.....	73	25	148

(a) Information not available.

(b) Consumed by the sulphur acid industries.

(c) Derived from sulphur rock above.

(d) Derived partly from sulphur rock alone and partly from crude sulphur imported from America and Italy as follows:—

1931..... 8,121 tons

1932..... 9,721 tons

(e) Estimated sulphur content of gas used in acid making.

(f) The result of the purification of manufactured fuel gases.

(g) Estimated sulphur content of gas driven off in the smelting of zinc and copper concentrates, chiefly used in acid making

(h) Produced in Germany from the desulphurization of gases.

(*) See also Pyrites (Table 277.)

SULPHURIC ACID

Production of sulphuric acid in Canada during 1933 amounted to 148,142 tons valued at \$1,702,629 at factory prices. Of this total, 65,927 tons at \$897,372 were made for sale and 82,215 tons at \$805,257 were for the further use of the makers in their own acid works or in associated plants.

Exports of sulphuric acid in 1933 totalled 1,014 tons at \$17,552, practically all to the United States. Imports were shown at 58 tons worth \$8,493.

In 1932 production in Canada amounted to 136,846 tons, exports totalled 721 tons and imports were reported at 62 tons.

Sulphuric acid was made during 1933 in plants located at Copper Cliff, Hamilton and Sulphide, in Ontario, at New Westminster, Barnet and Trail, in British Columbia and at Sydney, Nova Scotia.

Table 279.—Production, Imports, Exports and Apparent Consumption of Sulphuric Acid in Canada, 1923-1933

(Pounds)

Years	Production	Imports	Exports	Apparent consumption*
1923.....	174,300,512	582,400	24,406,400	150,476,512
1924.....	143,981,962	93,621	15,355,700	128,719,883
1925.....	166,791,926	103,340	38,358,600	128,536,666
1926.....	216,459,150	106,967	56,273,100	160,293,017
1927.....	196,940,218	105,546	34,814,200	162,231,564
1928.....	192,454,951	109,374	26,658,600	165,905,725
1929.....	221,497,046	222,075	16,793,800	204,925,321
1930.....	214,704,034	299,579	1,141,800	213,861,813
1931.....	239,081,443	159,601	1,993,300	237,247,744
1932.....	273,691,616	124,931	1,442,600	272,373,947
1933.....	296,283,890	116,174	2,027,000	294,373,064

*No allowance made for changes in stocks on hand.

SILICA BRICK

Production of silica brick in Canada during 1933 totalled 636 thousand valued at \$23,185 compared with 93 thousand at \$4,304 in 1932. The output in 1933 came from the plants of the Dominion Steel and Coal Corporation, Sydney, Nova Scotia, and the Algoma Steel Corporation, Sault Ste. Marie, Ontario.

Imports of fire brick containing not less than 90 per cent silica were evaluated at \$147,901 in 1933; in 1932 similar imports were appraised at \$122,952. No exports were recorded.

SODIUM CARBONATE (NATURAL)

Sales in 1933 of natural sodium carbonate produced from Canadian deposits amounted to 559 tons valued at \$5,773 compared with an output of 495 tons worth \$5,450 in 1932.

Shipments in 1933 were made only from deposits located in British Columbia; the B.C. Sodium Syndicate operated near Cherry creek in the Kamloops mining division; this company erected a small testing plant on the property and facilities for producing soda were improved. Sales of sodium carbonate were also reported in the same area by James A. Bishop; this output came from a property close to that of the B.C. Sodium Syndicate. The balance of the 1933 sales were reported by the Soda Mining and Products Co. Ltd., who stated that its lakes had been flooded for a year owing to the unusual heavy snowfall and a short wet summer.

Sodium carbonate, or soda ash, has many uses, being employed in the manufacture of glass, soap, and in the purification of oils, etc.

Imports of soda ash or barilla amounted to 1,616,483 pounds valued at \$23,256 in 1933 compared with 1,803,951 pounds at \$27,751 for the previous year. Soda bicarbonate imports amounted to 11,716,431 pounds valued at \$211,065 in 1933; similar imports totalled 10,592,208 pounds worth \$196,841 in 1932.

Soda ash (bags) was quoted in Canada, June, 1934, 100 pounds, \$2.05-\$2.25.

Table 280.—Production of Natural Sodium Carbonate in Canada, 1924-1933

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924	510	5,173	1929	600	8,100
1925	1,120	8,140	1930	364	4,550
1926	595	5,370	1931	712	7,351
1927	805	9,995	1932	495	5,450
1928	519	4,922	1933	559	5,773

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Natural sodium sulphate occurs in large deposits in Western Canada. In 1933, as for some years past, the entire Canadian production came from the province of Saskatchewan. The value of sales totalled \$485,416 in 1933, an increase of 78.6 per cent over 1932.

Sodium sulphate finds its principal use in the pulp and paper industry for the manufacture of "kraft paper" by the sulphate process, in the manufacture of glass, in the dyes industry, in the smelting of nickel-copper ores, and as one of the raw materials in the manufacture of sodium carbonate. Consumption of salt cake for the manufacture of wood pulp in Canada during 1933 totalled 29,563 tons valued at \$580,251 compared with 24,301 tons at \$489,343 in 1932.

Imports of crude sulphate of soda or salt cake totalled 5,191,036 pounds valued at \$34,371 in 1933 compared with 8,865,730 pounds at \$51,925 in 1932; these came, in the order of their importance, from the United Kingdom, United States and Germany. Sulphide of soda imports amounted to 4,417,786 pounds worth \$99,020 in 1933; in 1932 the quantity was 3,403,181 pounds worth \$73,069. Soda bisulphate or nitre cake imports totalled 1,148,499 pounds valued at \$15,989 in 1933 compared with 1,648,088 pounds at \$16,432 in the previous year. Glauber's salt imports amounted to 1,791,011 pounds worth \$13,237 in 1933; corresponding figures for 1932 were 1,806,882 pounds at \$11,027.

Table 281.—Production of Natural Sodium Sulphate in Canada, 1924-1933

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	1,083	6,004	1929.....	5,018	64,112
1925.....	3,876	19,380	1930.....		293,847
1926.....	6,775	13,550	1931.....		421,097
1927.....	5,659	11,319	1932.....		271,736
1928.....	6,016	68,804	1933.....		485,416

Table 282.—Production in Canada and Imports of Sodium Sulphate, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION— Natural Sodium Sulphate— Crude.....		421,097		271,736		485,416
IMPORTS—						
Soda, bisulphate of, or nitre cake.....	14,258	175,648	824	16,432	574	15,989
Soda, sulphate of, crude, known as salt cake.....	8,660	97,215	4,433	51,925	2,595	34,371
Glauber's salt.....	999	10,838	903	11,027	895	13,237
Soda ash or barilla.....	823	25,771	902	27,751	808	23,256

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain, Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported-Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, Slate and Stone.

Increases in Canadian population, national development and general industry during the years immediately preceding the commencement of the world economic crisis in 1929 were distinctly reflected by expansion in production of clay products and other structural materials. Economic factors, international in scope, and restrictive in nature, as existing since 1929, have unfortunately resulted in almost continuous recessions in the outputs of these particular materials. During the twenty-two years from 1907 to 1929 the valuation of these commodities increased from \$12,863,049 to \$58,534,834. In 1930 the value had fallen to \$53,727,465, in 1931 to \$44,158,295 and in 1933 to \$16,696,687.

In 1933 the domestic clay products production totalled \$2,262,835, a decrease of 38 per cent from the 1932 value; cement shipments amounted to 3,007,432 barrels valued at \$4,536,935 compared with 4,498,721 barrels worth \$6,930,721 in 1932; production of lime in 1933 totalled 323,540 tons worth \$2,432,306 as against 320,650 tons at \$2,394,537 in the preceding year; sand and gravel sales in 1933 were recorded at 11,738,823 tons evaluated at \$4,464,285 as contrasted with 14,469,942 tons at \$4,480,596 in 1932; stone production in 1933 amounted to 2,939,574 tons with a value of \$2,996,576, representing a pronounced decline in both tonnage and value from the output of 4,690,922 tons worth \$4,938,461 in 1932.

Contracts awarded for building and construction in Canada in 1912 as reported by MacLean Building Review were valued at \$463,083,000. In 1913 contracts awarded totalled \$384,157,000 and in the following year a decrease to \$241,952,000 was recorded. During the war period (1915-1918) construction was largely neglected and the value of building awards remained below the one hundred million dollar mark. A revival of building set in after the war and in each year since 1920, with the exception of 1932 and 1933 the volume of building has been well above the two hundred million dollar mark.

The value of all contracts awarded during 1933, as compiled by the MacLean Building Reports, Ltd., totalled \$97,289,800 as compared with \$132,872,400 in 1932, and \$576,651,800 in 1929. These figures reveal the severe contraction in general construction activities during recent years and when compared with data relating to production of non-metallic minerals emphasize the intimate relationship existing between the construction and structural materials industries.

Table 283.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1931-1933

Province	1931	1932	1933
	\$	\$	\$
Nova Scotia.....	970,933	432,075	378,320
New Brunswick.....	630,542	779,492	644,570
Quebec.....	18,104,022	8,062,951	5,747,715
Ontario.....	15,225,817	8,827,968	7,340,086
Manitoba.....	2,534,749	1,259,733	667,012
Saskatchewan.....	562,964	176,681	111,938
Alberta.....	2,185,839	1,039,093	654,334
British Columbia.....	3,943,429	1,820,290	1,152,712
Canada.....	44,153,295	22,398,283	16,696,687

Table 284.—Production, Imports, Exports, and Apparent Consumption of Clay Products and Other Structural Materials in Canada, 1931-1933

Item		Production	Imports	Exports	Apparent consumption
		\$	\$	\$	\$
Cement, Portland.....	1931	15,826,243	†156,734	124,267	15,858,710
	1932	6,930,721	†64,975	38,921	6,956,775
	1933	4,536,935	†42,739	47,369	4,532,305
Clay and clay products.....	1931	7,841,288	7,628,858	418,528	15,051,618
	1932	3,650,218	5,405,750	196,494	8,859,474
	1933	2,262,835	4,961,265	141,552	7,082,548
Lime.....	1931	2,764,415	10,561	283,459	2,491,517
	1932	2,394,537	6,241	188,329	2,212,449
	1933	2,432,306	4,444	192,029	2,244,721
*Sand and gravel.....	1931	6,651,165	375,126	146,060	6,880,231
	1932	4,480,596	211,546	33,620	4,658,522
	1933	4,464,285	232,611	15,801	4,681,095
Slate.....	1931	5,000	155,008	.....	160,008
	1932	3,750	57,931	.....	61,681
	1933	3,750	30,567	.....	34,317
Stone.....	1931	11,070,184	990,205	192,365	11,868,024
	1932	4,938,461	328,521	124,807	5,142,175
	1933	2,996,576	243,930	91,340	3,149,166
Total.....	1931	44,158,295	9,316,492	1,164,679	52,310,108
	1932	22,398,283	6,074,964	582,171	27,891,076
	1933	16,696,687	5,515,556	488,091	21,724,152

*Sand and gravel imports include silica sand for glass and carborundum manufacture and for use in steel plants. This was valued at \$352,796 in 1930, \$235,191 in 1931, \$162,869 in 1932, and \$160,131 in 1933.

†Includes cement manufactures.

CEMENT

Shipments from Canadian cement plants during 1933 totalled 3,007,432 barrels valued at \$4,536,935 as compared with 4,498,721 barrels worth \$6,930,721 in 1932.

Cement was produced in 1933 at plants located in Quebec, Ontario, Manitoba, Alberta and British Columbia. Mills in Quebec produced 50.5 per cent of the total Canadian shipments, those in Ontario, 36.4 per cent, Manitoba, 4.3 per cent, Alberta, 5.0 per cent and British Columbia, 3.8 per cent.

Imports of Portland cement into Canada during 1933 totalled 19,119 barrels (estimated at 350 pounds each) averaging \$1.97 per barrel as against 21,350 barrels averaging \$2.72 in 1932 and 38,392 barrels at \$3.74 in 1931. Exports of Portland cement were recorded at 52,531 barrels valued at \$47,369 in 1933 as compared with 53,333 barrels at \$38,921 in 1932.

The selling prices both in 1932 and 1933 f.o.b. Canadian works, were: high, \$2.55 and low, \$1.25 per barrel. During 1932 and 1933 the Canadian cement industry operated 41 rotary kilns possessing a total daily output capacity of 43,622 barrels. The industry in 1933 consumed 13,319 tons of gypsum and 616,364 tons of limestone as compared with 27,537 tons of gypsum and 1,141,376 tons of limestone in 1932. Both wet and dry processes were employed by the Canadian cement industry in 1933.

The Chemical Trade Journal and Chemical Engineer, London, England, states that many of the impediments to the development of reinforced concrete construction in Great Britain arising from out-of-date rules of practice, should be removed by the adoption of the recommendations of a report (Report of the Reinforced Concrete Structures Committee of the Building Research Board, published by H. M. Stationers Office, Price 1s. 3d.) issued recently by the Department of Scientific and Industrial Research. The report contains the findings of an authoritative committee under the chairmanship of Sir George Humphreys, appointed in 1931 to "review the present methods and regulations for the use of reinforced concrete in building and make recommendations for rules of practice embodying the best available technical information and experience." These recommendations are set out in a new code of practice appended to the report. A Building Research Technical Paper (No. 14 H. M. S. O., 2s. net), issued by the De-

partment of Scientific and Industrial Research, London, England, deals with the influence of temperature upon the strength development of concrete—"It is only within the last few years, the report states, "that it has been realized that the expansion, due to heat hydration of the cement, followed by contraction on subsequent cooling, has been largely responsible for the detrimental cracks that have been observed in large concrete masses." The report contains the latest results of laboratory work at the Building Research Station, corroborated by full scale tests, on the evolution of heat in concrete during setting. These experiments, it is believed, form the most complete examination of the subject yet made anywhere in the world.

The annual report of one of Canada's largest cement producers contains the following information relating to the industry in 1933. "The volume of building, including engineering projects, according to published statistics, fell to a lower level in Canada in 1933 than any year since 1915, but due also to the lack of purchasing power of the farmer and small user, the demand for cement was less than in any year since 1906. However, the extreme low point of the decline in cement consumption would appear to have been reached in February, 1933. After that month the decline, while still very severe, was of less intensity each month thereafter until October when for the first time in practically three years, there was a cessation of the downward trend . . . Business generally in Canada has shown slow but steady improvement over a period of several months and the prospects for construction work during the coming year are more favourable than at this time last year. There is reason for hope, therefore, that your company has passed through the worst of the depression period, and may look forward with some confidence to an increased volume of business."

A résumé of construction activity during 1933 by MacLean Building Reports, Ltd., Toronto, is as follows: "Contracts awarded during the early months of 1933 were so low it was predicted as late as August that the total for the year would not exceed seventy million dollars. Fortunately there was a decided pick-up in the fall and the final figures, as compiled by the MacLean Building Reports Ltd., show a total of \$97,289,800. This is a decline of 26.7 per cent from the 1932 total of \$132,872,400. The decline in buildings only was 22.1 per cent. Contemplated projects, however, amounted to \$213,645,600 as compared with \$186,017,400 for 1932, an increase of 14.8 per cent. A reversal of trend is distinctly noticeable and the prospect of a better year before us."

It is interesting to note the following statistical data relating to concrete paving completed in Canada as reported by the "Engineering and Contract Record"—square yards completed in 1913—469,000; 1923—1,457,082; 1929—3,824,156; 1930—3,482,681; 1931—3,342,932; 1932—1,159,305; 1933—973,122. The total square yards completed in Canada to the end of 1933 amounts to 34,243,350.

Rather wide publicity has been recently given to the possibilities of cement-bound macadam, and the Bureau of Mines, Washington, D.C., states that the wide adoption of this type of highway would open a large market for Portland cement in secondary road construction; this Bureau also refers to potential outlets for cement in the manufacture of concrete joists for residences and precast reinforced concrete mine timbering.

In addition to the standard first quality products of Canadian cement plants, there has recently been manufactured a high early strength cement; the development of this material was due largely to research work conducted in Canadian plants and it is reported that this particular type of cement is being employed rather extensively in the mining industry, especially for underground guniting, foundations and cementing diamond drill holes. Another new product of the Canadian cement industry resulting from Canadian research is an alkali resisting cement which, it is stated, is particularly suitable for construction in certain parts of the Prairie provinces.

Table 285.—Capital Employed in the Cement Industry in Canada, 1932 and 1933

	1932	1933
	\$	\$
1. Capital employed as represented by:		
(a) Present value of lands, buildings, plant, machinery and tools (estimated value if rented) . . .	49,881,915	49,207,078
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	1,446,538	1,080,568
(c) Inventory value of finished products on hand	1,440,291	1,199,073
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	2,525,070	2,916,660
Total	55,294,814	54,403,379

Table 286.—Employees, Salaries and Wages in the Cement Industry in Canada, 1932 and 1933

Class	1932		1933	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
		\$		\$
SALARIED EMPLOYEES.....	103	213,891	85	160,680
WAGE-EARNERS.....	1,113	1,130,881	655	621,066
Total	1,216	1,344,772	740	781,746

Table 287.—Production of Cement in Canada, 1924-1933

(For the years 1887 to 1923 see Mineral Production of Canada, 1928)

Year	Barrels	Value	Year	Barrels	Value
		\$			\$
1924.....	7,498,624	13,398,411	1929.....	12,284,081	19,337,235
1925.....	8,116,597	14,046,704	1930.....	11,032,538	17,713,067
1926.....	8,707,021	13,013,283	1931.....	10,161,658	15,826,243
1927.....	10,065,865	14,391,937	1932.....	4,498,721	6,930,721
1928.....	11,023,928	16,739,163	1933.....	3,007,432	4,536,935

Table 288.—Output, Sales, Imports, Exports and Consumption of Cement in Canada, 1931-1933

	1931		1932		1933	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
OUTPUT.....	10,197,964	15,826,243	4,643,675	6,930,721	2,410,518	4,536,935
SOLD OR USED.....	10,161,658	15,826,243	4,498,721	6,930,721	3,007,432	4,536,935
STOCKS DEC. 31.....	2,286,927		2,431,881		1,830,928	
IMPORTS—						
Portland cement.....	38,392	143,491	21,350	58,092	19,119	37,768
Manufactures.....		13,243		6,883		4,971
EXPORTS PORTLAND CEMENT.....	114,064	124,267	53,333	38,921	52,531	47,369
APPARENT CONSUMPTION.....	10,085,986		4,466,738		2,974,020	

1 brl.=350 pounds.

Table 289.—Production of Cement in Canada, by Provinces, 1931-1933

Province	1931		1932		1933	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
Quebec.....	4,942,323	7,092,895	2,210,584	3,155,702	1,517,555	2,128,900
Ontario.....	3,470,056	5,006,826	1,599,342	2,288,975	1,095,845	1,587,812
Manitoba.....	544,160	1,267,893	242,112	549,594	129,540	295,351
Alberta.....	626,483	1,286,080	193,571	399,922	149,206	299,530
British Columbia.....	578,636	1,172,549	253,112	536,528	115,286	225,342
Canada	10,161,658	15,826,243	4,498,721	6,930,721	3,007,432	4,536,935

CLAY AND CLAY PRODUCTS

The Clay and Clay Products Industry in Canada is classified into two divisions: (1) production from domestic clays, which includes the production of refractories, building brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe and pottery, and (2) production from imported clays, which includes the manufacture of porcelain insulators, refractories, earthenware, pottery and ceramic floor and wall tile.

There were 164 plants representing a total capital investment of \$28,432,648 operating in the domestic and imported clay products industries in Canada during 1933. These two industries provided employment for 1,848 persons during the year; their earnings totalled \$1,573,635. The combined production in 1933 was valued at \$3,467,887 as compared with \$5,240,629 in 1932.

1. Production from Domestic Clays

Clay and clay products sold by Canadian producers in 1933 were evaluated at \$2,262,835 as compared with \$3,650,218 in 1932, representing a decline of 38 per cent. Decreases in quantity were recorded for all products with the exception of drain tile, fireclay, ornamental brick and bentonite.

The almost continuous falling-off in sales as recorded during recent years in the clay products industry appears to have terminated as evidenced by trade returns for the first half of 1934 during which period the value of domestic clay products sales totalled \$1,056,540 or 17·9 per cent above the total for the corresponding period of 1933. This improvement, synchronous with an almost general increase in mineral production, would suggest the commencement of an uptrend in the consumption of construction materials.

Of the total value of the domestic clay products production in Canada in 1933, Ontario produced 45·3 per cent; Quebec, 25·6 per cent; Alberta, 8·8 per cent; British Columbia, 7·7 per cent; and the other provinces, in the order of the value of sales, were Nova Scotia, Saskatchewan, New Brunswick and Manitoba.

The Census of 1665-1666 records one brickmaker in New France, this operator being located on the north shore of the St. Lawrence. In 1933 plants for the production of brick and tile were active in every province of Canada except Prince Edward Island. Throughout the Dominion there were 157 works engaged in the making of various kinds of building brick, sewer pipe, refractories, structural tile and other clay manufactures from Canadian clays. In 1933 the domestic clay products industry employed \$24,211,880 in capital, provided employment for 1,312 persons, paid \$1,101,893 in salaries and wages, and consumed fuel and electricity to the value of \$377,321.

Five firms produced earthenware, stoneware and other pottery products from domestic clays and shipments of these products in 1933 were valued at \$200,447. The output of this particular branch of the industry came entirely from plants operating in New Brunswick, Ontario, Alberta and British Columbia. Fireclay was produced in Nova Scotia, New Brunswick, Saskatchewan and British Columbia. Bentonite sales were reported only from British Columbia in 1933; the material has been utilized chiefly in oil and gasoline refining and as an admixture for concrete and cement. Bentonite occurring near Edson, Alberta, has been employed in the manufacture of cosmetic products.

The Department of Railways, Labour and Industry, Saskatchewan, with the co-operation of the Ceramic Department of the University of Saskatchewan have, for the past two years, been conducting an investigation as to the possible use of some of the highly colloidal clays of Saskatchewan for the purpose of clarifying and de-colorizing oils and fats. Fifty Saskatchewan clays were investigated as to their possibilities for use in the place of imported clays of the Fuller's earth type now used in packing houses, refineries and other plants in Canada. In view of what has been learned concerning these clays for purposes described it may be expected that Saskatchewan will eventually supply the various Canadian refining industries with their requirements of clays of the Fuller's earth type.

China clay has been produced commercially only near St. Remi d'Amherst, Quebec. Deposits of high grade, white-burning clays occur on the Mattagami, Abitibi and Missinabi rivers in northern Ontario and some of these clays may be classed as ball clays and others as china clays. Ball clays of high bond strength occur in extensive deposits in southern Saskatchewan, about 60 miles south of Moose Jaw. Shipments have been made from the vicinity of Readlyn and Willows to potteries in Ontario and the United States.

Production of "Haydite", a patented building material, began in Ontario in the spring of 1929. The process involves the burning of shale or clay to clinker, the gases formed causing expansion of the clay or shale into a light weight, vitrified, cellular product. The clinker is crushed and screened, the product may be used as aggregate for concrete or moulded into blocks. Production of this item is included with "Other Clay Products".

For a classification and the uses of clays consult the annual report on the mineral production of Canada for the year 1932.

In this section all tables except Table 295 show data for the domestic clay products industry only.

Table 290.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1932 and 1933

Industry and provinces	1932 Capital employed as represented by					1933 Capital employed as represented by				
	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
By INDUSTRIES—										
<i>*Brick and Tile—</i>										
N. Scotia...	592,437	90,605	94,874	10,710	788,626	590,908	80,894	102,033	5,937	779,772
N. Bruns...	172,759	4,743	31,462	14,338	223,302	171,939	5,560	20,453	11,766	209,718
Quebec...	6,442,219	146,126	563,471	474,039	7,625,855	6,164,864	103,073	398,249	359,066	7,025,252
Ontario...	9,779,302	181,762	1,061,856	1,752,366	12,775,286	9,337,816	175,074	911,828	1,437,224	11,861,942
Manitoba...	116,301	6,681	40,376	73,224	236,582	123,301	1,756	37,230	44,406	206,693
S'chewan...	439,443	11,717	26,791	46,024	523,975	858,138	5,887	59,036	59,760	982,821
Alberta...	1,300,196	83,755	190,040	183,202	1,757,193	1,372,599	29,094	183,233	181,432	1,766,358
British C...	718,270	16,843	161,192	82,896	979,201	674,530	10,914	159,708	82,469	927,631
Total for Canada...	19,560,927	542,232	2,170,062	2,636,799	24,910,020	19,294,095	412,252	1,871,770	2,182,060	23,760,177
<i>Stoneware and pottery—</i>										
Total for Canada...	283,281	23,579	69,783	55,919	437,562	296,819	26,576	70,374	57,934	451,703
By PROVINCES—										
<i>Total for clay and clay products—</i>										
N. Scotia...	592,437	90,605	94,874	10,710	788,626	590,908	80,894	102,033	5,937	779,772
N. Bruns...	182,858	8,435	37,556	23,754	252,693	181,805	7,883	27,406	21,193	238,287
Quebec...	6,442,219	146,126	563,471	474,039	7,625,855	6,164,864	103,073	398,249	359,066	7,025,252
Ontario...	9,834,627	182,813	1,073,166	1,785,016	12,875,622	9,388,816	176,024	921,928	1,466,174	11,952,942
Manitoba...	116,301	6,681	40,376	73,224	236,582	123,301	1,756	37,230	44,406	206,693
S'chewan...	439,443	11,717	26,791	46,024	523,975	858,138	5,887	59,036	59,760	982,821
Alberta...	1,511,053	107,091	239,319	196,055	2,053,518	1,602,352	52,097	233,917	200,116	2,088,482
British C...	725,270	17,343	164,292	83,896	990,801	680,730	11,214	162,345	83,342	937,631
Canada...	19,844,268	570,811	2,239,845	2,692,718	25,347,582	19,590,914	438,828	1,942,144	2,239,994	24,211,880

*Clay, sewer pipe, firebrick, firebrick products and other clays included under Brick and Tile.

Table 291.—Average Number of Wage-Earners in the Clay Products Industry by Months, 1932 and 1933

Month	1932	1933
January.....	1,217	644
February.....	1,144	554
March.....	1,180	576
April.....	1,246	669
May.....	1,334	980
June.....	1,876	1,274
July.....	1,766	1,571
August.....	1,764	1,611
September.....	1,684	1,604
October.....	1,586	1,242
November.....	1,057	1,083
December.....	806	780

Table 292.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1932 and 1933

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1932						
Nova Scotia.....	9	114	123	22,929	70,199	93,128
New Brunswick.....	9	43	52	15,669	20,390	36,059
Quebec.....	66	299	365	102,227	225,604	327,831
Ontario.....	160	637	797	297,565	446,925	744,490
Manitoba.....	5	13	18	11,200	9,778	20,978
Saskatchewan.....	11	30	41	22,146	25,813	47,959
Alberta.....	26	158	184	56,881	128,438	185,319
British Columbia.....	18	142	160	37,058	83,764	120,822
Canada.....	301	1,436	1,740	565,675	1,010,911	1,576,586
1933						
Nova Scotia.....	8	68	76	17,569	29,967	47,536
New Brunswick.....	9	23	32	11,036	12,536	23,572
Quebec.....	52	237	289	93,712	151,123	244,835
Ontario.....	118	508	626	221,295	299,837	521,132
Manitoba.....	5	5	10	9,900	1,611	11,511
Saskatchewan.....	9	22	31	17,447	13,588	31,035
Alberta.....	20	105	125	40,846	90,599	131,445
British Columbia.....	18	105	123	29,161	61,666	90,827
Canada.....	239	1,073	1,312	440,966	663,927	1,101,893

*See note page 24.

Table 293.—Production of Clay Products in Canada from Domestic Clays, by Provinces, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1924.....	3,340	355,948	74,994	2,435,695	5,089,299	117,450	137,280	540,477	460,594	9,215,077
1925.....	3,020	422,690	69,473	2,426,887	5,195,084	173,794	95,952	618,860	523,931	9,529,691
1926.....		362,667	75,851	2,702,298	5,356,469	248,497	214,113	804,933	592,495	10,357,323
1927.....		416,417	87,185	2,734,738	5,853,035	201,464	311,204	889,358	679,788	11,173,189
1928.....		496,577	72,192	3,097,295	6,177,664	291,791	377,896	1,162,264	706,039	12,381,718
1929.....		653,157	160,006	3,187,702	6,830,162	362,240	502,522	1,342,427	886,427	13,904,643
1930.....		495,333	162,536	2,464,044	5,221,214	215,967	349,283	997,685	687,516	10,593,578
1931.....		467,126	143,348	2,360,908	3,552,800	122,628	166,257	529,716	498,505	7,841,288
1932.....		172,557	68,151	1,064,551	1,639,508	49,773	109,739	329,584	216,355	3,650,218
1933.....		125,500	46,917	580,088	1,024,579	20,966	92,207	198,373	174,205	2,262,835

Table 294.—Production of Clay Products in Canada, from Domestic Clays, by Provinces, 1931-1933

	1931		1932		1933	
	Sold or used	Per cent of total value	Sold or used	Per cent of total value	Sold or used	Per cent of total value
	\$		\$		\$	
Nova Scotia.....	467,126	6.0	172,557	4.7	125,500	5.5
New Brunswick.....	143,348	2.0	68,151	1.9	46,917	2.1
Quebec.....	2,360,908	30.0	1,064,551	29.2	580,088	25.6
Ontario.....	3,552,800	45.0	1,639,508	44.9	1,024,579	45.3
Manitoba.....	122,628	2.0	49,773	1.4	20,966	0.9
Saskatchewan.....	166,257	2.0	109,739	3.0	92,207	4.1
Alberta.....	529,716	7.0	329,584	9.0	198,373	8.8
British Columbia.....	498,505	6.0	216,355	5.9	174,205	7.7
Canada.....	7,841,288	100.0	3,650,218	100.0	2,262,835	100.0

Table 295.—Value of Clay Products Produced in Canada from Domestic and from Imported Clays, 1932-1933

Product	From domestic clays		From imported clays		Total	
	1932	1933	1932	1933	1932	1933
	\$	\$	\$	\$	\$	\$
†Fireclay blocks and shapes.....	75,209	80,625	212,838	220,484	288,047	301,109
Sanitary ware.....			*	*		
Ceramic or glazed floor and wall tile.....			*	*		
Pottery, glazed and unglazed.....	244,861	202,500	*	*	244,861	202,500
Electrical porcelain insulators.....			*	*		
Other clay products (brick, tile, sewer pipe, etc.).....	3,330,148	1,979,710	1,377,573	984,568	4,707,721	2,964,278
Total.....	3,650,218	2,262,835	1,590,411	1,205,052	5,240,629	3,467,887

*Included with other clay products.

†Includes firebrick and stove linings made in imported-clay products industry.

Table 296.—Production in Canada, Imports and Exports of Clay and Clay Products, 1931-1933

Kind	1931		1932		1933	
	Quantity	Total selling value	Quantity	Total selling value	Quantity	Total selling value
		\$		\$		\$
PRODUCTION—						
Brick: Soft mud process (Face..... M	5,476	116,316	6,188	108,582	2,482	41,737

Table 297.—Production of Building Brick in Canada, by Provinces, 1931-1933

—		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1931									
Soft mud process	Face.....	M 120	100		4,954			302	
		\$ 1,560	2,200		105,008			7,550	
Common.....		M 780	3,134		24,478	5,209	415	1,734	5,427
		\$ 10,660	42,671		375,130	70,688	5,451	22,280	88,477
Stiff mud process (wire cut)	Face.....	M 349	910	32,113	40,955	794	576	675	783
		\$ 9,970	25,669	766,988	873,334	17,577	20,233	12,328	26,848
Common.....		M 3,728	1,778	56,464	17,008	30	1,831	3,287	712
		\$ 54,573	26,311	841,868	249,880	360	18,095	3,287	11,110
Dry press	Face.....	M		2,894	13,991		27	2,779	458
		\$		74,970	300,614		720	28,937	18,116
Common.....		M		250	2,719			3,797	1,922
		\$		2,500	39,787			36,179	28,767
Fancy or ornamental brick.....		M		76	259				
		\$		3,944	16,829				
Sewer brick.....		M			1,946				307
		\$			33,321				10,371
Total.....		M	4,977	5,922	91,797	106,290	6,033	2,849	9,666
		\$	76,763	96,851	1,690,270	1,991,881	94,625	44,499	110,541
1932									
Soft mud process	Face.....	M 160		300	5,716				12
		\$ 2,008		3,000	103,390				184
Common.....		M 540	1,269	18	6,525	1,337	660	697	1,755
		\$ 6,780	18,180	912	98,828	18,166	6,929	8,345	24,232
Stiff mud process (wire cut)	Face.....	M 347	487	13,180	15,315	320	115	277	156
		\$ 6,754	13,628	300,649	323,077	7,472	3,127	6,386	3,663
Common.....		M 2,229	520	28,063	7,816	416	220	989	500
		\$ 31,206	7,949	448,470	122,905	6,861	2,256	11,648	7,627
Dry press	Face.....	M		319	4,667		6	310	220
		\$		9,563	97,897		138	3,876	8,073
Common.....		M		1,522	1,522			2,726	
		\$		24,070	24,070			22,692	
Fancy or ornamental brick.....		M		89	36				
		\$		4,447	1,790				
Sewer brick.....		M			638				5
		\$			12,071				85
Total.....		M	3,276	2,276	41,969	42,235	2,073	1,001	4,999
		\$	46,748	39,757	767,041	784,028	32,499	12,450	52,947
1933									
Soft mud process	Face.....	M 60			2,292		11		119
		\$ 900			38,360		333		2,144
Common.....		M 480	678	1,241	6,795	1,091	23		2,080
		\$ 5,680	9,992	9,862	87,644	16,035	369		27,187
Stiff mud process (wire cut)	Face.....	M 422	118	7,234	11,660	70	17	64	17
		\$ 10,233	3,676	153,990	240,738	1,683	624	1,078	345
Common.....		M 1,671	411	17,483	3,191		62	711	365
		\$ 20,046	6,972	270,483	46,337		641	6,542	5,477
Dry press	Face.....	M		601	3,302		8	476	157
		\$		18,166	72,194		185	4,557	6,150
Common.....		M			1,834			2,082	
		\$			29,357			15,020	
Fancy or ornamental brick.....		M			387			624	
		\$			242			7,437	
Sewer brick.....		M			3,683				1
		\$							10
Total.....		M	2,633	1,207	26,559	29,323	1,161	3,957	2,739
		\$	36,859	20,640	452,501	518,700	17,718	2,152	34,634

Table 298.—Production of Building Brick in Canada, 1924-1933

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or orna- mental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1924	M	10,831	50,079	80,565	124,556	35,203	12,794	755	2,690	317,473
	\$	185,248	746,044	1,842,224	1,880,631	761,572	168,043	98,460	40,775	5,722,997
1925	M	27,701	51,214	93,903	116,105	37,201	22,053	524	2,485	351,186
	\$	521,739	753,970	1,883,856	1,635,257	800,504	270,135	26,320	52,382	5,944,163
1926	M	28,235	78,158	101,028	94,046	30,423	19,450	462	6,546	358,348
	\$	556,573	1,145,490	2,146,362	1,624,055	651,236	260,598	24,057	117,194	6,525,565
1927	M	16,196	70,554	95,480	150,222	39,753	14,617	620	10,997	398,439
	\$	325,966	1,091,274	2,024,064	2,239,180	833,570	187,062	29,372	210,643	6,941,131
1928	M	17,532	93,280	101,717	144,404	36,587	24,294	599	2,888	421,301
	\$	349,847	1,328,981	2,247,472	2,182,307	748,301	337,096	28,763	59,010	7,281,777
1929	M	26,624	77,399	114,093	170,840	38,591	26,131	187	4,765	458,630
	\$	538,096	1,195,511	2,469,417	2,509,451	813,461	368,039	12,795	96,588	8,003,358
1930	M	11,350	56,487	99,284	105,225	29,434	16,915	339	804	319,838
	\$	247,220	861,805	2,135,871	1,480,965	604,197	208,495	27,649	15,299	5,581,591
1931	M	5,476	41,177	77,135	81,930	20,149	8,688	335	2,253	237,143
	\$	116,316	619,357	1,752,947	1,205,464	423,357	107,213	20,773	43,692	4,289,119
1932	M	6,188	12,801	30,197	40,753	5,522	4,248	125	643	100,477
	\$	108,582	182,372	664,756	638,922	119,547	46,762	6,237	12,156	1,779,334
1933	M	2,482	12,389	19,602	23,894	4,544	3,916	630	243	67,700
	\$	41,737	156,769	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517

Table 299.—Production of Paving Brick in Canada, 1923-1933

(For years 1897 to 1922 see previous reports)

Year	Quantity	Value
	M	\$
1923-25		
1926	122	5,015
1927	50	2,106
1928	338	4,464
1929	97	3,844
1930	9	297
1931	19	682
1932	6	155
1933	1	42

Table 300.—Production of Structural Tile in Canada, by Provinces, 1931-1933

Province	Hollow blocks (including fireproofing and load-bearing tile)		Roofing tile		Floor tile (quarries)	
	Tons	Value	No.	Value	Sq. ft.	Value
		\$		\$		\$
1931						
Nova Scotia	7,372	86,632				
New Brunswick	1,776	16,706				
Quebec	41,585	477,720				
Ontario	41,774	346,079	6,935	720	107,418	31,395
Manitoba	1,278	15,703				
Saskatchewan	3,177	28,299			81	20
Alberta	5,360	42,276				
British Columbia	3,313	33,219				
Canada	105,635	1,046,634	6,935	720	107,499	31,415
1932						
Nova Scotia	3,162	30,208				
New Brunswick	134	1,120				
Quebec	20,170	193,355				
Ontario	18,941	144,471	48,939	3,900	94,316	21,502
Manitoba	1,167	11,965				
Saskatchewan	1,322	11,781				
Alberta	2,106	17,055				
British Columbia	1,116	11,737				
Canada	48,118	421,672	48,939	3,900	94,316	21,502
1933						
Nova Scotia	1,759	17,590				
New Brunswick	65	631				
Quebec	7,676	66,197				
Ontario	8,196	60,438	20,469	1,136	81,808	12,490
Manitoba	44	532				
Saskatchewan	201	2,210				
Alberta	628	5,637			9,687	1,837
British Columbia	8,178	6,824				
Canada	26,747	160,059	20,469	1,136	91,495	14,297

Table 301.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1924-1933

(For the years 1888 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	76,355	1,594,280	1929.....		2,005,887
1925.....	73,791	1,440,269	1930.....		1,721,815
1926.....	75,996	1,480,776	1931.....		1,508,803
1927.....	77,262	1,475,875	1932.....		813,224
1928.....		1,723,644	1933.....		354,458

Table 302.—Production of Drain Tile in Canada, 1924-1933

(For the years 1891 to 1923 see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1924.....	15,137	409,369	1929.....	25,000	720,316
1925.....	14,552	401,503	1930.....	25,291	687,070
1926.....	14,258	396,018	1931.....	12,518	328,410
1927.....	22,259	598,098	1932.....	7,385	186,670
1928.....	22,629	656,054	1933.....	10,057	222,829

Table 303.—Production of Drain Tile and Sewer Pipe, in Canada, by Provinces, 1932 and 1933

Province	1932				1933			
	Drain tile		†Sewer pipe		Drain tile		†Sewer pipe	
	M	\$	Tons	\$	M	\$	Tons	\$
Nova Scotia.....	71	2,974		92,070	107	3,237		67,519
New Brunswick.....	3	120			1	64		
Quebec.....	545	20,609		83,566	533	15,420		45,890
Ontario.....	5,886	135,004		466,371	8,746	179,015		185,048
Manitoba.....	103	5,309			45	2,716		
Saskatchewan.....								
Alberta.....	130	1,322		112,810	22	1,249		35,793
British Columbia.....	647	21,332		58,407	603	21,128		20,208
Canada.....	7,385	186,670		813,224	10,057	222,829		354,458

†Includes copings, flue linings, etc.

Table 304.—Production of Pottery from Domestic Clays in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Value	Year	Value
	\$		\$
1924.....	238,342	1929.....	323,194
1925.....	267,255	1930.....	294,866
1926.....	320,135	1931.....	257,125
1927.....	307,057	1932.....	244,861
1928.....	356,093	1933.....	202,500

Table 305.—Production of Kaolin in Canada, 1922-1933

(For years 1912 to 1921 see previous reports)

Year	Tons	Value
		\$
1922.....	1,197	17,866
1923.....	163	2,369
1924-1926.....		
1927.....	24	120
1928.....	5	25
1929-1933.....		

Table 306.—Production of Fireclay in Canada, 1924-1933

(For years 1899 to 1923 see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	Tons	\$		Tons	\$
1924.....	3,645	26,258	1929.....	5,041	35,226
1925.....	623	6,544	1930.....	2,870	25,975
1926.....	2,513	23,258	1931.....	1,233	14,857
1927.....	5,070	35,961	1932.....	990	11,826
1928.....	5,123	35,284	1933.....	1,421	11,273

Table 307.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1924-1933

(For the years 1907 to 1922 see Mineral Production of Canada, 1928)

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1924.....	4,327	209,256	51,273	1929.....	5,196	251,043	130,411
1925.....	6,197	305,332	36,567	1930.....	3,789	177,608	147,309
1926.....	4,195	192,276	54,064	1931.....	2,248	107,597	83,039
1927.....	5,388	246,266	100,659	1932.....	1,580	71,757	75,209
1928.....	4,910	234,460	105,091	1933.....	1,547	73,226	80,625

Table 308.—Production of Refractories, in Canada, from Domestic Clays, By Provinces, 1932 and 1933

Province	1932					1933				
	Fireclay		Firebrick		Fire-clay blocks and shapes	Fireclay		Firebrick		Fire-clay blocks and shapes
	Quantity	Value	Quantity	Value	Value	Quantity	Value	Quantity	Value	Value
	Tons	\$	M	\$	\$	Tons	\$	M	\$	\$
Nova Scotia.....	45	280			277	22	220			75
New Brunswick.....	50	1,956			836	4	157			
Ontario.....										90
Saskatchewan.....	415	3,111	309	15,200	66,688	371	2,902	391	19,705	64,381
Alberta.....			11	547				12	506	
British Columbia.....	480	6,479	1,260	56,010	7,408	1,024	7,994	1,144	53,015	16,079
Canada.....	990	11,826	1,580	71,757	75,209	1,421	11,273	1,547	73,226	80,625

Table 309.—World Production of China Clay

(Supplied by Imperial Institute)

(Long tons)

Country	1931	1932	1933	Country	1931	1932	1933
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom.....	570,524	508,850	596,609	Saxony—			
India.....	23,365	13,486	21,935	Crude.....	39,666	106,706	(a)
Unfederated Malay States.....	396	186	36	Washed.....	35,618	27,640	(a)
Australia.....	6,188	5,110	8,477	Italy—			
FOREIGN COUNTRIES				Crude.....	23,023	30,203	(a)
Belgium (e).....	18,031	9,566	(a)	Washed and ground (c).....	4,500	8,206	(a)
Bulgaria.....	1,360	2,791	(a)	Kaolinic earth.....	900	800	(a)
Czechoslovakia (estimated).....	400,000	350,000	350,000	Portugal.....	6,513	6,763	9,416
Denmark—				Roumania (d).....	4,854	8,128	(a)
Crude.....	35,200	29,300	34,300	Spain (g).....	900	1,152	1,545
Washed and pressed.....	8,100	8,500	8,600	Algeria.....	(a)	2,975	(a)
Dried.....	1,700	800	700	United States (f).....	395,800	325,843	(a)
France.....	137,100	98,800	(a)	China.....	772,000	(a)	(a)
Germany—				Japan (estimated).....	400,000	400,000	400,000
Bavaria.....	327,520	373,917	(a)	Korea.....	4,700	11,821	24,536
Prussia.....	10,797	8,352	11,961	Sweden.....	1,497	1,389	1,878
				Netherlands East Indies.....	202	120	229
				Chile.....	3,740	(a)	(a)

NOTE.—77,585 long tons of china clay were recorded as produced in U.S.S.R. (Russia) during the year ended September 1928—later figures are not available. Austria also produces china clay.

(a) Information not available.

(c) Derived from crude and stocks.

(d) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(e) "Eurite" and Kaolin.

(f) Sales of china clay and paper clay.

(g) 74,930 and 3,940 cubic metres of kaolinic sand were also produced in quarries during 1931 and 1932 respectively.

IMPORTED CLAY PRODUCTS

In continuance of the custom followed in previous material production reports, a short review of the imported-clay products industry is given herewith.

A number of factories in Canada manufacture ceramic products from clays which they import chiefly from England and the United States. Refractories, sanitary earthenware, porcelain insulators, floor and wall tile and pottery are the principal commodities made in these works. The refractories include rigid fire brick stove linings, special shapes, plastic firebrick and high temperature cements; sanitary earthenware includes bathtubs, water closets, etc.; and pottery includes Rockinghamware such as teapots, bowls, etc., and art pottery such as lampstands, small vases and novelties.

In 1933 there were 18 factories in operation in this industry as compared with 16 in 1932 but output declined 24 per cent to \$1,205,052 from \$1,590,411 in the previous year. Capital employed was about the same at \$4,220,768 but the number of workers dropped to 536 from 715 and salaries and wages fell correspondingly to \$471,742 from \$707,269. Materials for manufacturing cost \$288,379 in 1933 as against \$406,441 in 1932.

Table 310.—Capital Employed in the Imported Clay Products Industry, by Classes and by Provinces, 1932 and 1933

Provinces	Present value of lands, buildings, fixtures, machinery and tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total capital employed
	\$	\$	\$	\$	\$
1932					
Quebec.....	1,445,582	95,546	200,361	210,985	1,952,474
Ontario.....	1,456,332	222,775	244,650	331,536	2,255,293
Canada.....	2,901,914	318,321	445,011	542,521	4,207,767
1933					
Quebec.....	1,443,722	115,079	107,187	191,068	1,857,056
Ontario.....	1,538,559	210,811	251,216	363,126	2,363,712
Canada.....	2,982,281	325,890	358,403	554,194	4,220,768

Table 311.—Employees, Salaries and Wages in the Imported Clay Products Industry, by Provinces, 1932 and 1933

Provinces	Average number of employees					Salaries	Wages	Total salaries and wages
	On salaries		On wages		Total			
	Male	Female	Male	Female				
1932						\$	\$	\$
Quebec.....	28	3	190	6	227	80,160	195,698	275,858
Ontario.....	46	12	351	79	488	132,969	298,442	431,411
Canada.....	74	15	541	85	715	213,129	494,140	707,269
1933								
Quebec.....	24	3	136	3	166	63,420	110,225	173,645
Ontario.....	42	10	251	67	370	94,389	203,708	298,097
Canada.....	66	13	387	70	536	157,809	313,933	471,742

LIME

Production of lime in Canada in 1933, including both quick and hydrated, amounted to 323,540 tons valued at \$2,432,306 as compared with 320,650 tons at \$2,394,537 in 1932 and 344,785 tons worth \$2,764,415 in 1931. Producers received an average of \$7.30 per ton for quicklime and \$8.57 for hydrated lime as compared with \$7.14 and \$9.14, respectively, in 1932; corresponding prices in 1931 were \$7.38 and \$10.71.

It is noteworthy that considerable interest has recently been taken in the salvaging of carbon dioxide for the manufacture of dry ice from kiln gases. An article in "Chemical and Metallurgical Engineering" describes the burning of lime as a comparatively simple process and the crude fuels, wood and coal, have been employed for this purpose from time immemorial. Recently, however, natural gas has been adopted (Alabama). With this fuel the kiln capacities were increased by more than 50 per cent, considerable labour was eliminated and a better and more uniform product obtained.

In 1933 the Canadian lime industry employed \$8,920,042 in capital, paid \$480,833 in salaries and wages to 696 employees and consumed \$473,125 worth of fuel and electricity.

Table 312.—Capital Employed in the Lime Industry in Canada, by Provinces, 1932 and 1933

Provinces	1932					1933				
	Capital employed as represented by					Capital employed as represented by				
	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
New Brunswick.....	217,079	19,719	7,604	23,689	268,091	174,559	17,046	8,146	32,299	232,050
Quebec.....	1,516,611	107,039	3,822	116,127	1,743,599	1,801,908	99,525	7,472	175,164	2,084,069
Ontario.....	3,239,608	51,647	18,167	115,360	3,424,782	3,351,631	88,561	8,057	57,885	3,506,134
Manitoba.....	601,059	11,641	2,213	3,000	617,913	2,193,403	56,140	40,602	11,995	2,302,140
Alberta.....	156,211	7,307	1,894	31,278	196,690	147,001	5,155	2,286	29,805	184,247
British Columbia.....	453,787	28,701	14,232	76,154	572,874	442,127	33,845	26,331	109,099	611,402
Canada....	6,184,355	226,054	47,932	365,608	6,823,949	8,110,629	300,272	92,894	416,247	8,920,042

* Includes data for 2 firms in Nova Scotia.

Table 313.—Employees, Salaries and Wages in the Lime Industry in Canada, by Provinces, 1932 and 1933

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1932						
New Brunswick†.....	10	56	66	12,975	43,552	56,527
Quebec.....	19	220	239	28,800	141,799	170,599
Ontario.....	19	182	201	27,676	161,752	189,428
Manitoba.....	7	65	72	10,144	50,359	60,503
Alberta.....	3	14	17	4,800	11,257	16,057
British Columbia.....	12	70	82	21,755	60,203	81,958
Canada.....	70	607	677	106,150	468,922	575,072
1933						
New Brunswick†.....	11	73	84	18,641	52,414	71,055
Quebec.....	19	218	237	23,629	117,944	141,573
Ontario.....	16	173	189	23,262	112,076	135,338
Manitoba.....	5	88	93	8,614	53,025	61,639
Alberta.....	3	12	15	4,350	11,624	15,974
British Columbia.....	11	67	78	7,365	47,889	55,254
Canada.....	65	631	696	85,861	394,972	480,833

* See note page 24.

† Includes data for 2 firms in Nova Scotia.

Table 314.—Production of Lime in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	319,793	3,178,541	1929.....	674,087	5,908,610
1925.....	358,979	3,387,652	1930.....	490,802	4,038,698
1926.....	413,901	3,781,484	1931.....	344,785	2,764,415
1927.....	444,753	3,923,388	1932.....	320,650	2,394,557
1928.....	508,889	4,534,568	1933.....	323,540	2,432,306

Table 315.—Production of Lime in Canada, 1932 and 1933, Showing Purposes for Which Sold or Used

Purposes for which sold or used	1932				1933			
	Quicklime		Hydrated lime		Quicklime		Hydrated lime	
	Tons	Value \$	Tons	Value \$	Tons	Value \$	Tons	Value \$
Building Trades—								
Finishing lime.....	2,462	23,115	21,251	255,468	3,467	23,340	17,318	222,387
Masons' lime.....	16,375	140,955	4,617	46,386	9,667	82,565	3,697	35,838
Sand-lime brick.....	2,793	20,260	9	113	1,846	12,413	387	3,675
Agricultural.....	1,186	11,115	1,924	17,070	33,016	248,627	2,833	25,304
Chemical—								
Smelters.....	5,073	41,878	530	4,610	7,241	59,155	735	6,161
Iron and steel mills.....	13,888	84,325	28	211	13,179	92,703	8	79
Cyanide mills.....	19,043	132,911	17	139	20,655	147,395	28	223
Pulp and paper mills.....	53,347	343,479	17,945	103,225	68,346	431,472	24,463	134,971
Glass works.....	5,920	44,586			5,735	56,738		
Sugar refineries.....	14,022	117,609	20	250	12,994	106,503	25	215
Tanneries.....	2,467	17,304	242	1,691	2,680	17,966	415	3,562
Other chemical works.....	120,582	845,628	2,348	21,052	76,633	584,339	2,673	23,464
Dealers (uses unspecified).....	9,745	84,150	3,451	28,807	12,086	89,340	2,852	19,391
Other consumers.....	1,365	8,200			382	3,166	179	1,314
Total.....	268,268	1,915,515	52,382	479,022	267,927	1,955,722	55,613	476,584

Table 316.—Production of Lime in Canada, by Provinces, 1931-1933

Province		Quicklime		Hydrated lime		Total	
		Sold or used		Sold or used		Sold or used	
		Tons	Value	Tons	Value	Tons	Value
			\$		\$		\$
Nova Scotia.....	1931	17,790	73,018	640	6,400	18,430	79,418
	1932	6,075	30,954	458	4,580	6,533	35,534
	1933	3,325	24,270	589	5,890	3,914	30,160
New Brunswick.....	1931	5,161	61,729	6,080	65,325	11,241	127,054
	1932	5,547	59,064	6,025	50,120	11,572	109,184
	1933	8,059	68,446	8,790	66,340	16,849	134,786
Quebec.....	1931	101,186	720,049	10,310	84,169	111,496	804,218
	1932	76,983	493,787	16,830	94,114	93,813	587,901
	1933	89,740	539,603	20,594	107,955	110,334	647,555
Ontario.....	1931	113,376	842,274	34,284	379,996	147,660	1,222,270
	1932	143,185	1,018,007	23,518	255,223	166,703	1,273,230
	1933	126,460	1,006,906	19,733	220,291	146,193	1,227,197
Manitoba.....	1931	16,575	126,789	4,439	80,612	21,014	207,401
	1932	15,047	116,369	3,188	55,741	18,235	172,110
	1933	14,793	110,957	3,239	56,683	18,032	167,640
Alberta.....	1931	5,056	46,047	62	738	5,118	46,785
	1932	6,529	55,336	113	1,241	6,642	56,577
	1933	7,403	61,061	98	976	7,501	62,037
British Columbia.....	1931	20,364	195,978	9,462	82,191	29,826	277,269
	1932	14,902	141,998	2,250	18,003	17,152	160,001
	1933	18,147	144,479	2,570	18,449	20,717	162,928
Canada.....	1931	279,508	2,064,984	65,277	699,431	344,785	2,764,415
	1932	268,268	1,915,515	52,382	479,022	320,650	2,394,537
	1933	267,927	1,955,722	55,613	476,584	323,540	2,432,306

Table 317.—Imports into Canada and Exports of Lime, 1931-1933

Item	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Imports.....	568	10,561	322	6,241	272	4,444
Exports.....	14,425	283,459	9,344	188,329	10,389	192,029

SAND AND GRAVEL

Production statistics for the sand and gravel industry in Canada were first collected in 1912. Prior to that year the only data available consist of Customs' records of sand and gravel exported. In 1886 exportations amounted to 124,865 tons; twenty-four years later exports had risen to 624,824 tons appraised at \$407,974. During 1912, production was valued at \$1,512,099 and wages paid to the 875 pit employees totalled \$527,425. It was not until 1916 that tonnage statements were obtained from the operators in this industry; the total for that year amounted to 8,156,207 tons at \$1,838,320. Since 1918, the annual production has exceeded the 10-million ton mark. The highest market valuation per ton for this material was received in 1920, when 11,530,795 tons were sold for \$4,201,067. From 1927 to 1931, during a period of intensive construction, each annual output was in excess of 21,000,000 tons, there was, however, a pronounced decline to 14,469,942 tons in 1932 and 11,738,823 tons in 1933, recessions that reflected widespread restriction in building activities.

Sand and gravel production in Canada during 1933 amounted to 11,738,823 tons valued at \$4,464,285 as compared with 14,469,942 tons at \$4,480,596 in 1932. Imports of sand and gravel into Canada in 1933 totalled 89,017 tons valued at \$72,480 compared with 36,387 tons worth

\$48,677 in 1932. Silica sand for glass and carborundum manufacture and for use in steel foundries, filtration plants and sand blasting was imported to the value of \$160,131 and totalled in quantity 64,114 tons compared with \$162,869 and 59,176 tons in the preceding year.

During 1933 the sand and gravel industry in Canada furnished employment to 2,726 persons whose earnings totalled \$1,169,079. Excluding statistics regarding the sand and gravel operations of railway companies, the fixed and current assets of the operators in this industry amounted to \$6,203,113. Fuel and electricity used in 1933 cost \$129,410.

The sand blast now touches almost every phase of metal finishing. It enters into the production of bath tubs, beer barrels, crank shafts, small tools and hundreds of other products. Telephones, the minute drills used by dentists, automobiles and railroad cars, all may find applications of the sand blast in some process of their manufacture. The type of finish desired governs the selection of abrasives to some extent. Ordinary bank or building sands are of little value. Ocean sands are much used, but carefully selected and prepared white silica sand has greater resistance to disintegration, creates less dust, and enables faster cleaning. Most sands used for sand blasting weigh approximately 97 pounds per cubic foot.¹

Moulding sand may be separated into two general classes, with and without natural bond. Sand of the first class, when removed from the pit contains sufficient clay, loam, or other foreign material to bond it when tamped into place around the pattern. Sand of the second class does not contain sufficient natural bonding material and some such substance as refractory clay or organic binder must be mixed with it. Sand with little or no natural bond is often termed "silica sand" or steel moulding sand; for steel moulding the material should contain more than 96 per cent of silica before the addition of artificial bond. Naturally-bonded sand is sometimes called "foundry sand," "iron-moulding sand" or simply "moulding sand" to distinguish it from "silica sand." The general properties that determine the value of a sand for foundry purposes are: (1) bond or cohesiveness; (2) permeability; (3) grain size; (4) refractoriness; and (5) durability. Sand is also used to line furnace bottoms and walls, especially in furnaces for making acid open-hearth steel; it is also largely used in forming the bottoms of copper refining furnaces and reverberatory copper smelting furnaces; at the more important producing centres soft sandstone of high silica content is used, as in the crushed form it contains enough bonding material to meet the specifications of the steel industry. Good filter sand must be fairly uniform and fall within limiting sizes. It must, moreover, be free from clay and organic matter and of high chemical purity, specifications generally stating that not more than 2 per cent shall be soluble in hot hydrochloric acid. Other specifications require that the combined lime and magnesia, calculated as carbonates, shall not exceed 2 per cent. With regard to grain size, specifications usually state that no grains shall be larger than a certain mesh and limit the percentage that will pass a 100 mesh sieve. Sand in sand-lime brick has a twofold function. Most of it acts merely as an aggregate making up the body of the brick, which is bound together by a cementing material, the remainder supplies silica for the formation of the mono-calcium silicate bond. Extreme chemical purity is not essential, but the sand should be reasonably clean and free from organic substances. Most of the sand used for glass making contains more than 99 per cent silica; quality depends largely on the kind and quality of glass being made.²

Silica sand is generally prepared from a friable sandstone; in Manitoba a high grade natural silica sand is produced from loosely consolidated deposits on Black Island, while it is reported that near Bruno de Guigues in Quebec, a large deposit of free running, high grade silica sand is under development; this property is equipped with a one hundred ton mill. Various grades of the high quality silica sands are also being produced in Canadian mills from quartz or other silica rock; silix is the washed sand or pure quartz crushed or ground in some form of ball mill, then either air or water-floated to recover the fine flour. The ceramic industry requires 150 mesh or finer while the paint trade requires air-floated material of 250 mesh or finer.³

¹ "Iron Age." ² "The Chemical Age." ³ Department of Mines, Ottawa.

Table 318.—Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1932 and 1933

Province	1932					1933				
	Capital employed as represented by					Capital employed as represented by				
	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	81,000			49,000	130,000	400				400
New Brunswick.....	47,195	756		2,350	50,301	47,457	686		1,187	49,330
Quebec.....	632,401	30,850	8,900	8,310	680,461	249,642	3,300	800	6,703	260,445
Ontario.....	5,494,391	64,384	107,371	753,330	6,419,476	3,928,524	12,139	81,612	257,559	4,279,834
Manitoba.....	594,601	3,107	37,502	189,990	825,200	593,604	3,833	36,267	183,953	817,657
Saskatchewan.....						1,200				1,200
Alberta.....	359,086	45	987		360,118	5,500				5,500
British Columbia.....	1,024,568		18,530	33,792	1,076,890	756,440	3,460	5,737	23,110	788,747
Canada.....	8,233,242	99,142	173,290	1,035,772	9,542,446	5,582,767	23,418	124,416	472,512	6,203,113

Table 319.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1932 and 1933

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1932						
Nova Scotia.....		92	92		86,097	86,097
New Brunswick.....	1	373	374	1,482	257,336	258,818
Quebec.....	18	341	359	23,363	157,123	180,486
Ontario.....	50	442	492	103,433	249,048	352,481
Manitoba.....	9	174	183	18,065	147,930	165,995
Saskatchewan.....					12,548	12,548
Alberta.....	1	126	127	410	163,279	163,689
British Columbia.....	13	82	95	18,465	83,622	102,087
Canada.....	92	1,651	1,743	165,218	1,158,983	1,322,201
1933						
Nova Scotia.....		1,003	1,003		100,784	100,784
New Brunswick.....	1	259	260	378	203,273	203,651
Quebec.....	7	851	858	12,091	430,102	442,193
Ontario.....	31	329	360	62,555	170,635	233,190
Manitoba.....	10	118	128	14,033	83,007	97,040
Saskatchewan.....		11	11		3,389	3,389
Alberta.....		41	41		35,394	35,394
British Columbia.....	12	53	65	17,704	35,734	53,438
Canada.....	61	2,665	2,726	103,761	1,062,318	1,166,079

* See note page 24.

Table 320.—Production of Sand and Gravel in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	11,603,500	3,181,083	1929.....	27,846,945	7,317,814
1925.....	11,018,647	3,220,410	1930.....	28,547,511	8,344,913
1926.....	17,112,798	4,941,434	1931.....	21,748,586	6,051,165
1927.....	22,952,819	6,055,601	1932.....	14,460,942	4,480,596
1928.....	28,102,917	5,809,431	1933.....	11,738,823	4,464,285

Table 321.—Production in Canada, Imports and Exports of Sand and Gravel, 1931-1933

Kind	1931			1932			1933		
	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value
	Tons	Tons	\$	Tons	Tons	\$	Tons	Tons	\$
PRODUCTION—									
Sand—									
Moulding sand.....	30	13,851	9,940	178	8,315	5,355	3,444	4,273	9,635
Building sand and sand for concrete, roadwork, etc.....	1,671,798	1,517,450	1,069,210	1,930,323	437,981	745,091	347,410	428,002	218,559
Core sand.....		2,158	3,237	100	600	1,125	325		325
Other sand (including blast and engine sands).....	84,936	48,301	43,123	2,204	41,584	13,474	216	33,177	6,086
Sand and Gravel—									
Sand and gravel for railway ballast....	1,296	3,592,155	459,531	23,363	2,073,861	324,648	72,338	489,200	110,449
Sand and gravel for concrete, roads, etc.....	5,551,284	8,800,999	4,784,298	5,399,762	4,204,351	3,181,105	6,367,489	3,590,343	3,907,911
Crushed gravel.....	326,767	137,561	281,826	319,160	28,160	209,798	359,395	43,211	211,320
Total.....	7,636,111	14,112,475	6,651,165	7,675,090	6,794,852	4,480,596	7,150,617	4,588,206	4,464,285
Imports—		\$			\$			\$	
Sand, silica, for glass and carborandum manufacture, etc.....	107,712	235,191		59,176	162,869		64,114	160,131	
Sand and gravel, n.o.p.	155,482	139,935		36,387	48,677		89,017	72,480	
Total.....	263,194	375,126		95,563	211,546		153,131	232,611	
EXPORTS.....	485,813	146,060		177,710	33,620		102,174	15,801	

NOTE.—Production includes all classes of sand and gravel.

Table 322.—Production of Sand and Gravel in Canada, by Railway Operators, 1931-1933

Kind	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Sand—						
Moulding sand.....					203	300
Building sand and sand for concrete, roads, etc.....	358,926	33,995	2,359	636	10,120	2,092
Other sand (including blast, core and engine sands).....	31,425	5,102	35,051	7,419	29,247	5,509
Sand and Gravel—						
Sand and gravel for railway ballast.....	3,591,925	459,173	2,056,715	312,689	472,921	79,371
Sand and gravel for concrete, roads, etc.....	214,721	41,120	103,834	23,213	215,739	35,348
Crushed gravel.....	22,349	1,656				
Total.....	4,219,346	541,105	2,197,959	343,957	728,230	122,620

Table 323.—Production of Sand and Gravel in Canada, by Operators Other than Railways, 1931-1933

Kind	1931			1932			1933		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$	Tons	Tons	\$
Sand—									
Moulding sand.....	30	13,851	9,940	178	8,315	5,355	3,444	4,070	9,335
Building sand and sand for concrete, roads, etc.....	1,671,798	1,158,524	1,035,215	1,930,323	435,622	744,455	347,410	417,882	216,467
Core sand.....		2,158	3,237	100	600	1,125	325		325
Other sand (including blast, and engine sands).....	84,936	16,876	37,961	2,204	6,533	6,055	216	3,930	577
Sand and Gravel—									
Sand and gravel for railway ballast.....	1,296	230	358	23,363	17,146	11,959	72,338	16,279	31,078
Sand and gravel for concrete, roads, etc.	5,551,284	8,586,278	4,743,178	5,399,762	4,100,517	3,157,892	6,367,489	3,374,604	3,872,563
Crushed gravel.....	326,767	115,212	280,170	319,160	28,160	209,798	359,395	43,211	211,320
Total.....	7,635,111	9,593,129	6,110,059	7,675,090	4,595,893	4,133,639	7,150,617	3,859,976	4,341,665

Table 324.—Production of Sand and Gravel in Canada, by Provinces, 1931-1933

Kind	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1931								
Sand—								
Moulding sand.....	tons 30			13,588	125			138
	\$ 75			9,437	188			240
Building sand and sand for concrete, roadwork, etc.....	tons 3,000		1,474,242	1,336,353	50,217	35,263	145,216	144,957
	\$ 750		450,798	533,250	11,356	4,039	15,357	53,660
Core sand.....	tons			1,850	308			
	\$			2,775	462			
Other sand (including blast sand, engine sand, etc.).....	tons 880		11,893	77,194	5,105	17,820	3,734	16,611
	\$ 792		15,515	19,156	1,729	2,411	558	2,962
Sand and Gravel—								
Sand and gravel for railway ballast.....	tons 62,554	154,059	1,139,845	644,929	37,407	770,835	351,088	432,734
	\$ 8,578	13,816	152,504	83,181	5,023	101,583	45,997	48,849
Sand and gravel for concrete, roads, etc.....	tons 337,394	29,416	4,923,235	5,183,126	695,185	524,176	550,950	2,108,801
	\$ 188,562	4,333	1,243,991	1,792,781	246,718	258,674	251,704	797,535
Crushed gravel.....	tons		108,749	207,977	83,639	40,500		23,463
	\$		90,151	121,897	28,702	30,000		11,076
Total.....	tons 403,858	183,475	7,657,934	7,465,017	871,986	1,388,594	1,050,988	2,726,704
	\$ 198,757	18,149	1,952,959	2,552,477	291,178	395,707	313,616	914,322
1932								
Sand—								
Moulding sand.....	tons 34		144	7,864	417			34
	\$ 78		62	4,389	620			206
Building sand and sand for concrete, roadwork, etc.....	tons 191,523	12,191	699,504	1,434,751	16,968	8	3,784	9,575
	\$ 42,567	8,310	228,278	456,039	5,615	14	1,547	2,721
Core sand.....	tons			700				
	\$			1,125				
Other sand (including blast sand, engine sand, etc.).....	tons	581	7,025	4,485	202	15,319	6,129	10,047
	\$	155	6,144	850	42	3,120	1,365	1,798
Sand and Gravel—								
Sand and gravel for railway ballast.....	tons 12,881	48,148	1,131,464	363,278	28,111	345,572	89,859	77,911
	\$ 2,000	6,804	173,155	40,993	3,959	63,428	15,493	18,816
Sand and gravel for concrete, roads, etc.....	tons 219,049	507,069	1,504,261	5,021,478	378,328	1,942	627,270	1,344,716
	\$ 92,032	431,910	392,602	1,383,177	174,163	380	225,117	481,724
Crushed gravel.....	tons	1,161	115,730	161,891	16,283		7,025	45,230
	\$	60	93,655	84,696	4,545		6,503	20,339
Total.....	tons 423,487	569,150	3,453,123	6,994,447	440,399	362,841	734,067	1,487,513
	\$ 136,677	447,239	893,896	1,971,239	188,974	66,942	259,025	525,694
1933								
Sand—								
Moulding sand.....	tons		45	7,560	91			21
	\$		40	9,332	137			126
Building sand and sand for concrete, roadwork, etc.....	tons	3,480	649,720	92,181	24,308	744		4,979
	\$	2,626	180,172	26,625	6,437	1,378		1,321
Core sand.....	tons			325				
	\$			325				
Other sand (including blast sand, engine sand, etc.).....	tons	729	3,332	5,197	756	12,571	3,611	7,197
	\$	176	630	942	112	2,428	597	1,201
Sand and gravel—								
Sand and gravel for railway ballast.....	tons 31,441	50,661	60,696	279,637	16,123	76,425	15,753	30,802
	\$ 5,633	10,238	12,684	59,748	2,702	11,213	2,248	5,983
Sand and gravel for concrete, roads, etc.....	tons 250,787	442,091	2,378,290	5,456,486	243,901	14,660	261,758	909,859
	\$ 120,398	318,457	922,766	2,340,730	97,665	4,712	82,732	320,451
Crushed gravel.....	tons		264,149	126,608	3,035			8,814
	\$		126,137	79,528	1,775			3,880
Total.....	tons 282,228	496,961	3,356,232	5,967,994	288,214	104,499	281,122	961,672
	\$ 126,031	331,497	942,429	2,517,239	108,828	19,731	85,577	332,962

SAND-LIME BRICK

On account of its association with other building materials, data regarding the production of sand-lime brick are included in this report. Statistics relating to sand-lime brick are not included in the totals for structural materials industries as both the sand and lime used have been so recorded; production of sand-lime brick is regarded as a manufacturing operation and therefore is shown in the report on the *Manufactures of the Non-Metallic Minerals*, issued annually by the Bureau.

Production of sand-lime brick in Canada during 1933 was reported at 8,541 M valued at \$91,468, a decline of 21 per cent in quantity and 30 per cent in value from the 1932 output of 10,819 M at \$131,440. Continued inactivity in the building trades resulted in the 1933 output being the smallest since the commencement of annual records. In 1920 production amounted to 39,264 M at \$693,641, in 1930 the record of 82,271 M at \$1,038,510 was reached, and in 1931 the output was 46,003 M at \$469,783.

Only 6 factories manufactured sand-lime brick during 1933; 4 of these were in Ontario and 2 were in Quebec. Capital employed amounted to \$789,962, the number of workers was 67 and payments for salaries and wages aggregated \$62,584. Materials for manufacturing, chiefly sand and quicklime, cost \$37,934.

Table 325.—Production of Sand-Lime Brick in Canada, 1929-1933

Years	Ontario		Other provinces		Canada	
	Quantity	Selling value at works	Quantity	Selling value at works	Quantity	Selling value at works
	M	\$	M	\$	M	\$
1929.....	60,400	708,584	17,961	245,142	78,361	953,726
1930.....	41,576	424,178	11,194	142,844	52,770	567,022
1931.....	34,400	313,189	11,603	156,594	46,003	469,783
1932.....	6,823	78,398	3,996	53,042	10,819	131,440
1933.....	6,922	69,784	1,619	21,684	8,541	91,468

SLATE

Slate deposits located along the south shore of the St. Lawrence river in Quebec, were operated for the first time in 1854. Production from these deposits reached a maximum in point of value in 1889 when 6,935 tons valued at \$119,160 were shipped. These shipments consisted of roofing slates, mantels and slabs. Quarrying operations were carried on at the Quebec deposits up to 1923, in which year 1,836 tons of crushed green and red slate were shipped for use in the manufacture of roofing material. No production from these deposits has been recorded since that date.

During 1908, a slate quarry was operated at Jarvis Inlet, British Columbia and since 1931 a quarry at Leechtown, Victoria Mining Division, British Columbia, has shipped crushed slate to companies manufacturing or selling roofing materials.

Table 326.—Production of Slate in Canada, 1923-1933

Year	Tons	Value	Year	Tons	Value
		\$			\$
1923.....	1,836	17,289	1931.....	250	5,000
1924-1929.....			1932.....	250	3,750
1930.....	150	3,000	1933.....	250	3,750

NOTE—For years 1886 to 1922 see previous reports.

Table 327.—Imports of Slate into Canada, 1931-1933

	1931		1932		1933	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Roofing.....Squares	3,777	42,523	1,521	11,819	914	7,064
School-writing.....		78,748		35,732		17,816
Pencils.....		2,932		2,810		722
Mantels and manufactures of slate, n.o.p.....		30,805		7,570		4,965
Total.....		155,008		57,931		30,567

THE STONE INDUSTRY IN CANADA

Including (1) the Stone Quarrying Industry and (2) the Monumental and Ornamental Stone Industry

The stone industry in Canada comprises two main divisions: (1) *The Stone Quarrying Industry*, including quarries and dressing works operated in conjunction with quarries, and (2) *The Monumental and Ornamental Stone Industry*, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the monumental and ornamental stone industry are included under manufacturing. For convenience this report carries data for both of these industries.

The Canadian stone industry, as a whole, in 1933 included the operations of 500 plants with a total capital investment of \$21,219,369. Production during the year was valued at \$4,471,453 which includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1933 numbered 2,706 and their combined earnings amounted to \$2,092,201.

The two industries are treated separately in the following review.

(1) PRIMARY PRODUCTION—The Stone Quarrying Industry

Statistics of the stone industry as set forth in the general tables of this report have been confined to quarrying operations and to the production of dressed stone when this operation is carried on in conjunction with the quarrying. The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are widely distributed throughout Canada. The products from quarries operating in these formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their growing requirements.

Shipments of stone from Canadian quarries during 1933 amounted to 2,939,574 tons valued at \$2,996,576 compared with 4,690,922 tons worth \$4,938,461 in 1932 and 8,397,860 tons at \$11,070,184 in 1931. Production in 1933 comprised 256,723 tons of granite, 2,572,911 tons of limestone, 10,897 tons of marble and 99,043 tons of sandstone; in addition 250 tons of slate valued at \$3,750 were shipped from a quarry in British Columbia and 616,364 tons of limestone were consumed in the cement industry.

The tonnage of limestone shipments in 1933 constituted 87·5 per cent of the total Canadian stone production and the quarrying of this particular rock occurred in every province of the Dominion with the exception of Saskatchewan and Prince Edward Island. Of the total quantity of limestone shipped Ontario produced 47·5 per cent, Quebec, 43·9 per cent, and British Columbia,

5.9 per cent. Limestone consumption was generally at lower levels than during the preceding year. However, it is interesting to note that there were increases of 90.3 per cent in the tonnage going as flux to smelters, 32 per cent in that going to paper mills and 21.5 per cent employed as asphalt filler.

Marl produced in Quebec, for agricultural purposes, is classified with limestone in this report.

The leading granite producing provinces in 1933, in the order of the value of their shipments, were Quebec, British Columbia and New Brunswick; the greatest single item in tonnage was for road metal. Important quantities of granite were also utilized as rubble and riprap and for concrete aggregate; the higher qualities were sold for building and monumental purposes.

Marble was quarried in 1933 in Quebec, Ontario and British Columbia. The better grade stone was utilized chiefly in construction and for monuments; other grades were used in paper mills, for poultry grit, in stucco dash, in terrazzo flooring and as rubble and riprap. Sandstone in 1933 was shipped from properties in Nova Scotia, New Brunswick, Quebec, Ontario, Alberta and British Columbia and was employed as building stone, flagstone, rubble and riprap, concrete aggregate and road metal.

Although the primary stone industry in Canada during 1933 continued generally to reflect the depression being experienced in the building trades, there was, however, evidence of improvement at the close of the year and especially during the period January 1 to June 30, 1934, when the estimated value of stone and sand and gravel revealed a 20 per cent increase compared with the corresponding period of 1933. The recent uptrend in construction is also evidenced by the increase in the value of contracts awarded during the first nine months of 1934 as compared with the same period in 1933, the figures being, respectively, \$98,145,100 and \$63,430,700, as compiled by the MacLean Building Reports Ltd.

As a result of research work conducted in the laboratories of the Mines Branch, Ottawa, a new limestone-using industry is shortly to be established in Canada, namely, an industry that will produce rock wool—a highly efficient insulating material. Investigations have resulted in the discovery of limestone of suitable composition in Ontario and rock wool of a very high quality has been produced therefrom during experimental work.

Table 328.—Capital Employed in the Stone Quarrying Industry in Canada, by Provinces, 1932 and 1933

Provinces	1932					1933				
	Capital employed as represented by					Capital employed as represented by				
	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable etc.	Total	Present value of lands, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.	1,295,255	16,589	12,450	4,093	1,328,387	691,637	23,803	7,919	3,758	727,117
New Brunswick.	129,168	25,246	15,437	28,555	198,406	155,535	15,851	10,353	24,364	206,103
Quebec.....	4,635,435	313,053	189,032	824,637	5,962,157	4,413,874	328,572	184,390	847,555	5,774,391
Ontario.....	6,673,046	245,374	274,138	441,378	7,633,936	6,789,665	226,124	264,099	323,005	7,602,893
Manitoba.....	452,069	44,584	1,212	93,385	591,250	541,470	39,111	.....	54,562	635,143
Alberta.....	.....	.....	.....	.....	.....	12,000	.....	.....	800	12,800
British Columbia..	760,759	38,948	16,050	188,588	1,013,345	542,901	34,721	17,664	204,465	799,751
Canada	13,954,732	633,794	508,319	1,580,636	16,727,481	13,147,082	668,182	484,425	1,458,509	15,758,198

Table 329.—Employees, Salaries and Wages in the Stone Industry in Canada, by Provinces, 1932 and 1933

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1932						
Nova Scotia.....	6	51	57	7,565	32,977	40,542
New Brunswick.....	9	84	93	13,100	65,356	78,456
Quebec.....	116	1,352	1,468	184,082	893,090	1,080,172
Ontario.....	88	569	657	186,188	417,490	603,678
Manitoba.....	20	109	129	57,463	76,078	133,541
Alberta.....						
British Columbia.....	11	94	105	22,185	92,821	115,006
Canada.....	259	2,259	2,509	470,583	1,580,812	2,051,395
1933						
Nova Scotia.....	7	68	75	7,460	43,841	51,301
New Brunswick.....	9	75	84	8,612	45,053	53,665
Quebec.....	81	1,000	1,141	99,944	524,634	624,578
Ontario.....	72	346	418	132,307	216,889	349,196
Manitoba.....	19	64	83	42,733	28,388	71,121
Alberta.....		3	3		3,392	3,392
British Columbia.....	11	70	81	20,513	77,007	97,520
Canada.....	199	1,686	1,885	311,569	939,207	1,250,776

*See note page 24.

Table 330.—Average Number of Wage-Earners in Primary Stone Industries, by Months, 1932 and 1933

Month	1932	1933	Month	1932	1933
January.....	1,605	689	July.....	3,011	2,319
February.....	1,640	839	August.....	3,087	2,245
March.....	1,702	899	September.....	2,852	2,374
April.....	1,907	1,157	October.....	2,508	2,358
May.....	2,564	1,823	November.....	1,918	1,853
June.....	2,901	2,175	December.....	1,237	1,249

Table 331.—Production of Granite* in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	419,971	1,013,345	1929.....	1,728,165	3,080,815
1925.....	971,718	2,014,555	1930.....	1,851,132	3,379,951
1926.....	1,064,423	1,574,627	1931.....	1,190,887	2,763,050
1927.....	730,049	1,393,557	1932.....	1,190,822	1,110,582
1928.....	1,195,810	2,366,946	1933.....	256,723	679,585

*Includes all igneous rock.

Table 332.—Production of Limestone and Sandstone in Canada, 1924-1933

(For the years 1886 to 1923 see Mineral Production of Canada, 1928)

Year	Limestone		Sandstone		Year	Limestone		Sandstone	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1924.....	4,249,061	4,831,684	94,603	240,273	1929.....	7,720,840	8,172,681	159,407	398,974
1925.....	4,643,853	5,049,563	87,502	145,757	1930.....	7,732,675	8,075,616	384,610	769,060
1926.....	5,283,745	5,657,328	44,127	112,347	1931.....	6,262,430	6,305,538	924,101	1,332,883
1927.....	6,438,379	7,145,917	132,799	232,793	1932.....	3,687,241	3,227,715	500,480	349,458
1928.....	6,949,420	7,267,437	100,951	223,236	1933.....	2,572,911	2,142,516	99,043	108,562

Table 333.—Production of Marble in Canada, 1924-1933

(For the years 1886 to 1923 see Annual Report Mineral Production in Canada, 1928)

Year	Tons	Value	Years	Tons	Value
		\$			\$
1924.....	4,379	322,455	1929.....	14,012	414,062
1925.....	3,046	254,922	1930.....	26,089	809,582
1926.....	5,295	521,572	1931.....	20,442	668,713
1927.....	5,209	503,037	1932.....	12,379	250,706
1928.....	7,753	414,682	1933.....	10,897	65,913

Table 334.—Production of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1932

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough..... tons	1,397	79	18,160	13,630	3,422			36,688
\$	9,784	565	38,781	78,588	13,711			141,423
Dressed..... tons	17	1,320	16,246	5,166	3,494		20	26,263
\$	805	28,400	561,932	58,410	213,585		980	894,142
Monumental and ornamental—								
Rough..... tons	275	258	3,623	696	18		517	5,397
\$	5,400	5,045	25,827	34,619	232		4,919	76,642
Dressed..... tons	143	601	1,166	44			734	2,688
\$	6,656	83,199	75,645	1,473			31,630	198,693
Flagstone..... tons			332	228				560
\$			2,282	540				2,822
Curbstone..... tons		68	5,677					5,745
\$		2,222	24,169					26,391
Paving blocks..... tons		84	1,905	260			12	2,261
\$		1,022	14,435	1,940			55	17,452
Lining open-hearth furnaces..... tons					173			173
\$					302			302
Chemical—								
Flux in iron and steel plants.... tons			1,513	49,660	1,290			52,463
\$			2,123	36,172	1,984			49,279
Flux in smelters..... tons				13,164			25,771	38,935
\$				9,345			20,835	30,180
Glass factories..... tons						958		958
\$						1,437		1,437
Pulp and paper mills..... tons	3,428		37,841	30,365	6,596		21,106	99,336
\$	6,845		33,726	25,289	7,195		20,393	93,448
Sugar refineries..... tons				19,503	8,077			27,580
\$				11,552	9,285			29,837
Other chemical uses..... tons			69	7,625				7,694
\$			374	2,265				2,639
Whiting..... tons	37		2,195					2,232
\$	661		1,756					2,437
Asphalt filler..... tons			14,481	5,832				20,313
\$			41,691	15,709				57,400
Dusting coal mines..... tons	2,369					430	30	2,829
\$	11,845					1,506	203	13,554
Agricultural purposes..... tons	1,581	9,864	51,791	4,440			248	67,924
\$	5,534	30,458	49,348	6,077			1,037	92,454
Poultry grit..... tons	1		47	2,531	514		69	3,162
\$	15		305	7,397	755		516	8,988
Stucco dash..... tons			1,635	725			109	2,469
\$			9,595	3,226			791	13,612
Terrazzo flooring..... tons			5,351	94				5,445
\$			7,208	564				7,772
Rubble and riprap..... tons	2,003	3,678	150,352	13,709	3,184		239,919	412,845
\$	2,992	2,911	89,000	10,948	2,204		208,238	316,353
Concrete aggregate tons	17,652	843	1,502,011	407,359	1,851	40		1,929,756
\$	28,080	1,096	1,002,853	285,958	2,059	42		1,320,088
Crushed stone: Road metal..... tons	5,758		405,923	1,282,001	49,804		108,885	1,847,371
\$	8,670		369,867	975,130	47,970		73,233	1,474,870
Railroad ballast..... tons			26,507	48,106			15,222	89,835
\$			9,894	59,814			15,222	84,930
Total..... tons	34,661	16,805	2,246,825	1,905,138	78,423	1,428	407,642	4,690,922
\$	87,307	154,918	2,360,901	1,655,016	299,282	2,985	378,052	4,938,461
Per cent of total..... Quantity	0.74	0.36	47.90	40.61	1.67	0.03	8.69	100.00
Value	1.77	3.14	47.81	33.51	6.06	0.06	7.65	100.00

NOTE.—In addition 250 tons of slate were produced in British Columbia.

Table 335.—Production of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1933

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough..... tons	.....	167	14,975	13,205	461	.....	730	29,538
Dressed..... tons	.....	723	34,127	28,073	1,319	.....	4,380	63,622
..... \$	.....	140	7,848	1,223	1,272	78	200	19,761
..... \$	.....	5,600	206,911	6,541	39,678	4,500	9,000	272,230
Monumental and ornamental—								
Rough..... tons	230	367	3,038	324	.....	.....	352	4,311
Dressed..... tons	3,100	18,742	25,794	11,764	.....	.....	3,597	62,997
..... \$	415	449	1,647	13	.....	.....	685	3,299
..... \$	21,075	58,865	113,988	404	.....	.....	24,187	218,519
Flagstone..... tons	.....	19	24	823	.....	.....	.....	866
..... \$	.....	675	61	1,685	.....	.....	.....	2,421
Curbstone..... tons	.....	202	1,027	30	.....	.....	.....	1,259
..... \$	.....	2,363	4,099	9	.....	.....	.....	6,471
Paving blocks..... tons	.....	161	1,370	80	.....	.....	30	1,641
..... \$	.....	1,840	8,736	500	.....	.....	200	11,276
Lining open-hearth furnaces..... tons	.....	.....	.....	.....	240	.....	.....	240
..... \$	.....	.....	.....	.....	450	.....	.....	450
Chemical—								
Flux in iron and steel plants..... tons	.....	.....	887	19,456	725	.....	.....	21,063
..... \$	.....	.....	1,180	11,674	1,106	.....	.....	13,967
Flux in smelters..... tons	.....	.....	.....	46,792	.....	.....	27,314	74,106
..... \$	.....	.....	.....	36,496	.....	.....	22,402	58,893
Glass factories..... tons	.....	.....	50	.....	.....	771	.....	821
..... \$	.....	.....	375	.....	.....	1,157	.....	1,532
Pulp and paper mills..... tons	4,584	3,892	56,780	32,427	9,259	.....	25,228	132,170
..... \$	7,451	5,051	46,843	28,686	9,469	.....	35,010	132,519
Sugar refineries..... tons	.....	.....	.....	14,636	9,421	.....	.....	24,957
..... \$	.....	.....	.....	10,980	10,833	.....	.....	21,813
Other chemical uses..... tons	35	.....	25	63,005	.....	.....	.....	63,065
..... \$	542	.....	162	68,235	.....	.....	.....	63,939
Whiting..... tons	.....	.....	.....	.....	.....	.....	.....	.....
..... \$
Asphalt filler..... tons	178	.....	24,469	133	.....	.....	.....	24,780
..... \$	808	.....	70,362	914	.....	.....	.....	72,084
Dusting coal mines..... tons	.....	.....	.....	.....	.....	487	.....	487
..... \$	.....	.....	.....	.....	.....	1,948	.....	1,948
Agricultural purposes..... tons	6,717	10,350	47,894	13,385	.....	.....	293	78,639
..... \$	19,510	36,649	43,172	9,323	.....	.....	1,426	119,089
Poultry grit..... tons	.....	20	62	1,208	486	214	174	2,164
..... \$	.....	204	465	5,183	709	1,212	1,260	9,033
Stucco dash..... tons	.....	.....	966	2,346	.....	.....	61	3,373
..... \$	.....	.....	5,632	14,463	.....	.....	428	20,523
Terrazzo flooring..... tons	.....	.....	238	.....	.....	.....	.....	238
..... \$	.....	.....	1,675	.....	.....	.....	.....	1,675
Rubble and riprap..... tons	85	350	82,685	4,454	1,295	.....	85,847	174,716
..... \$	127	140	61,749	2,186	944	.....	71,373	136,519
Concrete aggregate..... tons	.....	.....	717,586	263,864	.....	.....	10	981,469
..... \$	.....	.....	477,420	204,768	.....	.....	25	682,213
Crushed stone: Road metal..... tons	29,205	.....	352,053	729,671	10,031	.....	92,021	1,212,951
..... \$	44,016	.....	326,297	526,562	9,719	.....	62,910	969,574
Railroad ballast..... tons	.....	597	28,869	46,831	.....	.....	17,327	93,624
..... \$	.....	518	19,692	14,822	.....	.....	17,327	52,359
Total..... tons	41,449	16,714	1,342,493	1,253,906	33,190	1,550	250,272	2,939,574
..... \$	96,629	131,376	1,418,740	983,268	74,227	8,817	253,523	2,996,576
Per cent of total..... Quantity	1.41	0.57	45.67	42.66	1.13	0.05	8.51	100.00
..... Value	3.22	4.38	48.35	32.81	2.48	0.30	8.46	100.00

Note.—In addition 250 tons of slate were produced in British Columbia.

Table 336.—*Production of Stone in Canada, by Kinds and by Provinces, 1932 and 1933

Province	Granite		Limestone		Marble		Sandstone	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
1932								
Nova Scotia.....	3,635	\$ 18,461	9,974	\$ 27,990	.....	.....	21,052	\$ 40,856
New Brunswick.....	4,369	102,699	10,707	31,554	.....	.....	1,729	20,665
Quebec.....	143,520	541,689	1,622,802	1,337,688	9,832	206,502	470,671	275,022
Ontario.....	73,272	186,357	1,825,793	1,419,049	2,065	40,175	4,008	9,435
Manitoba.....	18	232	78,405	299,050	.....	.....	.....	.....
Alberta.....	.....	.....	1,428	2,985	.....	.....	.....	.....
British Columbia.....	266,008	261,144	138,132	109,399	482	4,029	3,020	3,480
Canada.....	490,822	1,110,582	3,687,241	3,227,715	12,379	250,706	500,480	349,458
1933								
Nova Scotia.....	8,145	36,675	21,514	43,911	.....	.....	11,790	16,043
New Brunswick.....	1,792	82,771	14,262	41,904	.....	.....	660	6,695
Quebec.....	131,837	408,207	1,129,248	940,019	7,983	42,283	73,425	58,231
Ontario.....	19,650	39,433	1,222,752	910,419	2,614	21,083	8,890	12,333
Manitoba.....	332	2,987	32,858	71,240	.....	.....	.....	.....
Alberta.....	.....	.....	1,472	4,317	.....	.....	78	4,500
British Columbia.....	94,967	109,512	150,805	130,706	300	2,547	4,200	10,760
Canada.....	256,723	679,585	2,572,911	2,142,516	10,897	65,913	99,043	108,562

*For production of slate see Table 326.

Table 337.—*Production of Stone in Canada, by Kinds, Showing Purposes for Which Used, 1932 and 1933

Kind	Granite		Limestone		Marble		Sandstone	
	Tons	Value \$	Tons	Value \$	Tons	Value \$	Tons	Value \$
Building—								
Rough.....1932	6,131	17,272	25,073	104,391			5,484	19,766
.....1933	1,749	6,994	20,987	49,548	35	2,083	6,767	9,997
Dressed.....1932	12,469	336,632	11,173	348,187	1,951	188,743	670	20,550
.....1933	4,140	114,318	5,638	111,235	165	27,377	818	19,300
Monumental and ornamental—								
Rough.....1932	4,423	39,522	9	106	965	36,414		
.....1933	3,758	49,469			553	13,528		
Dressed.....1932	2,477	196,071	241	2,532				
.....1933	3,090	215,616	118	2,868			1	35
Flagstone.....1932	428	2,282	67	67			65	473
.....1933	70	35	24	61			772	2,325
Curbstone.....1932	5,745	26,391						
.....1933	1,224	6,437	35	34				
Paving blocks.....1932	2,261	17,452						
.....1933	1,641	11,276						
Lining open-hearth furnaces.....1932			173	302				
.....1933			240	450				
Chemical—								
Flux in iron and steel plants.....1932			52,463	40,279				
.....1933			21,068	13,960				
Flux in smelters.....1932			38,935	30,180				
.....1933			74,106	58,898				
Glass factories.....1932			958	1,437				
.....1933			771	1,157	50	375		
Pulp and paper mills.....1932			97,623	92,027	1,713	1,421		
.....1933			128,852	129,856	3,318	2,654		
Sugar refineries.....1932			27,580	20,837				
.....1933			24,057	21,813				
Other chemical uses.....1932			7,694	2,639				
.....1933			63,065	68,939				
Whiting.....1932			37	681	2,195	1,756		
.....1933								
Asphalt filler.....1932			20,313	57,400				
.....1933	92	736	24,688	71,348				
Dusting coal mines.....1932			2,829	13,554				
.....1933			487	1,948				
Agricultural purposes.....1932			67,924	92,454				
.....1933			78,639	110,080				
Poultry grit.....1932	3	69	2,367	4,789	792	4,130		
.....1933	3	60	891	3,325	1,270	5,648		
Stucco dash†.....1932			91	616	2,378	12,996		
.....1933	1,193	9,544	61	428	2,119	10,551		
Terrazzo flooring.....1932			4,745	3,084	700	4,688		
.....1933					238	1,675		
Rubble and riprap.....1932	276,892	237,349	118,946	62,364	1,685	558	15,322	16,082
.....1933	103,584	89,651	30,848	15,535	3,149	2,022	37,135	29,311
Crushed stone—								
Concrete aggregate.....1932	30,419	25,134	1,450,927	1,049,395			448,410	245,559
.....1933	19,259	21,962	961,854	659,975			347	276
Road metal.....1932	149,574	212,408	1,667,268	1,215,404			30,529	46,998
.....1933	116,323	152,969	1,043,455	769,217			53,203	47,318
Railroad ballast.....1932			89,835	84,930				
.....1933	597	518	93,027	51,841				
Total.....1932	490,822	1,110,582	3,687,241	3,227,715	12,379	250,706	500,480	349,458
.....1933	256,723	679,585	2,572,911	2,142,516	10,897	65,913	99,043	108,562

*For production of slates see Table 326.

†Includes granules for roofing.

Table 338.—Production in Canada, by Kinds and by Provinces, Imports and Exports of Stone, 1931-1933

	1931		1932		1933	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION, BY KINDS—						
Granite.....	1,190,887	2,763,050	490,822	1,110,582	256,723	679,585
Limestone.....	6,262,430	6,305,538	3,687,241	3,227,715	2,572,911	2,142,516
Marble.....	20,442	668,713	12,379	250,706	10,897	65,913
Sandstone.....	924,101	1,332,883	500,480	349,458	99,043	108,562
Slate.....	250	5,000	250	3,750	250	3,750
Total.....	8,398,110	11,075,184	4,691,172	4,942,211	2,939,824	3,000,326
PRODUCTION, BY PROVINCES—						
Nova Scotia.....	83,181	225,632	34,661	87,307	41,449	96,629
New Brunswick.....	62,325	341,991	16,805	154,918	16,714	131,370
Quebec.....	4,265,529	5,893,042	2,246,825	2,360,901	1,342,493	1,448,740
Ontario.....	3,359,364	2,881,444	1,905,138	1,655,016	1,253,906	983,268
Manitoba.....	153,248	642,649	78,423	299,282	33,190	74,227
Alberta.....	2,496	9,642	1,428	2,985	1,550	8,817
British Columbia.....	471,967	1,080,784	407,892	381,802	250,522	257,275
Canada.....	8,398,110	11,075,184	4,691,172	4,942,211	2,939,824	3,000,326
IMPORTS—						
Building stone, other than marble or granite, sawn on more than two sides, but not sawn on more than four sides.....	837	7,824	17	275	4	200
Building stone, other than marble or granite, planed, turned, cut or further manufactured than sawn on four sides....	110	3,544	7	796		
Flagstone, rough sandstone, and all building stone, not hammered, sawn or chiselled.....		150,593		32,887		8,947
Flagstone and building stone other than marble or granite, sawn on not more than two sides.....		20,377		1,758		729
Granite, rough, not hammered or chiselled.....		50,599		48,351		48,928
Granite, sawn only.....		3,815		7,689		5,366
Granite, manufactures of, n.o.p.....		19,848		11,240		8,495
Granite monuments.....		94,806		68,466		28,916
Paving blocks.....		25		626		25
Marble, rough, not hammered or chiselled.....		90,526		18,648		7,063
Marble, sawn or sand rubbed, not polished.....		144,971		27,132		10,474
† Marble, manufactures of, n.o.p.....		103,528		43,044		35,221
Refuse stone.....	237,373	197,810	33,388	28,559	41,277	35,773
Slate, including roofing, pencils, writing, mantels, and manufactures, n.o.p.....		155,008		57,931		30,567
Mineral wool.....			155	5,301	1,115	38,262
Manufactures of stone, n.o.p.....		62,376		34,221		15,531
Total.....		1,105,650		386,924		274,497
EXPORTS—						
Crushed stone.....	74,244	135,140	43,993	80,451	40,343	76,162
Granite and marble, unwrought.....	2,938	52,058	2,133	41,172	964	12,997
Freestone, limestone, and other building stone, unwrought.....	305	2,087	20	100	173	1,480
Dressed stone.....		3,080		3,084		701
Total.....		192,365		124,807		91,340

† Includes marble, not further manufactured than sawn, when imported by manufacturers of tombstones to be used exclusively in the manufacture of such articles in their own factories.

2. SECONDARY PRODUCTION—Monumental and Ornamental Stone Industry

Production from stone dressing works, operated separately from quarries, amounted in value to \$2,162,650 in 1933. This output was 27 per cent under the 1932 total of \$2,961,914, which in turn was 50 per cent under the value of \$5,989,372 for 1931.

During 1933 the number of plants engaged solely in cutting or dressing stone for building or monumental purposes was 212, of which 107 were in Ontario, 49 in Quebec, 15 in Manitoba, 10 in British Columbia, 9 in Saskatchewan, 8 in Nova Scotia, 7 in New Brunswick, 5 in Alberta and 2 in Prince Edward Island. These concerns reported fixed and working capital at \$5,461,171, the number of employees at 821, and payments in salaries and wages at \$841,425. Unfinished stone bought for cutting or dressing cost \$691,523 delivered at the works and the value added by manufacturing was \$1,471,127.

Table 339.—Principal Statistics of the Monumental and Ornamental Stone Industry, 1929-1933

Years	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of materials at works	Selling value of products at works	Value added by manufacturing
		\$		\$	\$	\$	\$
1929.....	220	7,107,162	1,863	3,045,084	2,788,934	8,224,060	5,435,126
1930.....	226	7,468,687	1,919	3,044,877	2,759,870	8,355,605	5,595,735
1931.....	223	6,580,835	1,436	2,145,023	1,770,559	5,989,372	4,218,813
1932.....	206	5,828,109	1,003	1,200,214	928,572	2,961,914	2,033,342
1933—							
Prince Edward Island and Nova Scotia.....	10	129,099	34	33,371	49,392	124,603	75,211
New Brunswick.....	7	60,899	22	20,083	8,223	48,699	40,476
Quebec.....	49	1,371,845	216	221,753	136,216	434,681	298,465
Ontario.....	107	3,070,934	403	437,419	399,006	1,229,316	830,310
Manitoba.....	15	288,839	51	41,158	47,357	117,705	70,348
Saskatchewan.....	9	170,661	30	25,364	20,264	64,688	44,424
Alberta.....	5	246,754	27	29,723	14,249	85,189	70,940
British Columbia.....	10	122,140	38	32,551	16,816	57,769	40,953
Canada.....	212	5,461,171	821	841,425	691,523	2,162,650	1,471,127

Table 340.—Products of the Monumental and Ornamental Stone Industry, 1932 and 1933

Products	Total selling value at works	
	1932	1933
	\$	\$
Granite, cut and polished (a) Monuments.....	1,164,283	1,111,354
(b) For building purposes.....	79,136	40,224
Marble, cut and polished (a) Monuments.....	180,323	200,313
(b) For building purposes.....	339,627	73,445
Marble chips and dust.....	5,191	2,712
Limestone (a) Monuments and bases.....	43,652	30,370
(b) For building purposes.....	536,294	281,074
Finished monuments, lettered only.....	487,286	346,364
Other products.....	26,122	42,036
Repairs and custom work (re-lettering, etc.).....		34,758
Total.....	2,961,914	2,162,650

APPENDIX ONE

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1933.

Arsenic.—White arsenic (As_2O_3) shipped from Canadian smelters at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining, at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the net amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made by British Columbia, Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20·671834 per fine ounce until the end of 1930. For succeeding years gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price for the refined metal in Canadian funds.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co. Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co. Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London in Canadian funds.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements of quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

CHAPTER X

DIRECTORY

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given and the location of the properties worked in 1933 is also shown.

METAL MINING INDUSTRIES

Alluvial Gold Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
Mullach Gold Exploration Syndicate.....	309 Barrington St., Halifax.....	Mullach River.
QUEBEC—		
Cooke & Lloyd.....	St. Simon Les Mines.....	Beauce Co.
Gold River Mining Co., Ltd.....	956 New Birks Bldg., Montreal.....	Compton Co.
ALBERTA—		
McLeod River Mining Co., Ltd.....	412 Brock Bldg., Toronto.....	McLeod River.
BRITISH COLUMBIA—		
Amador Mining Co., Ltd.....	541 Georgia St. W., Vancouver.....	Stanley.
Barkerville Gold Mines, Ltd.....	525 Seymour St., Vancouver.....	Barkerville.
Boundary Creek Mining Co.....	814 Metropolitan Bldg., Vancouver.....	Greenwood Mining Div.
Bride, Maurice.....	Atlin.....	Spruce Creek.
Brodin, W. F.....	Hudson Hope.....	Peace River.
Brodtt, J.....	Spence's Bridge.....	Thompson River.
Buchanan & Cumming.....	Atlin.....	Atlin Dist.
Compagnie Française des Mines d'or du Canada.....	19 Rue d'Aurnale, Paris, France.....	Atlin Dist.
Consolidated Gold Alluvials of B.C., Ltd.....	1040 Georgia St. W., Vancouver.....	Cariboo Dist.
Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Atlin Dist. and Omineca Dist.
Coughlan, John B.....	Revelstoke.....	Camp Creek.
Cummings, F. L. & Bryson C.....	1412 Howe St., Vancouver.....	Ashcroft Mining Div.
Eldorado Placers, Ltd.....	1044 Beach Ave., Vancouver.....	Cariboo Dist.
Elieff, McDonald & McKay.....	Atlin.....	Spruce Creek.
Falconer, D. H.....	Atlin.....	Spruce Creek.
French Creek Development Co., Ltd.....	17 Vancouver Block, Vancouver.....	Big Bend Dist.
French Creek Hydraulic Placers, Ltd.....	c/o Cobb & Warren, Central Bldg., Calgary, Alberta.....	Barkerville.
Hodges & Moran.....	Atlin.....	Wright Creek.
Jensen, Jack.....	Atlin.....	Atlin Lake Dist.
Johnson, Nelson & Ueland.....	Atlin.....	Spruce Creek.
Kennedy & Sundstrum.....	Atlin.....	Atlin Dist.
Lower Bridge River Placers, Ltd.....	525 Seymour St., Vancouver.....	Lillooet Mining Div.
Little McLeod Placers, Ltd.....	604 Bank of Toronto Bldg., Victoria.....	Omineca Mining Div.
Lowhee Mining Co., Ltd.....	1109 Rust Bldg., Tacoma, Washington, U.S.A.....	Cariboo Dist.
Lykegard, C. E.....	Atlin.....	Spruce Creek.
Morrison, McKay & Johnson.....	Atlin.....	Ruby Creek.
Morse, McKechnie & Brett.....	Atlin.....	Spruce Creek.
Moorehead Syndicate.....	717 McDowall Bldg., Seattle, Wash., U.S.A.....	Cariboo Dist.
Munro, P.....	Prince George.....	Cariboo Mining Div.
Murphy, Nathan.....	Atlin.....	O'Donnell River.
Nilta Development Co., Ltd.....	207 West Hastings St., Vancouver.....	Atlin Dist.
Nord Bros.....	Atlin.....	Wright Creek.
Perret, François.....	Quesnel.....	Fraser River.
Placer Engineers, Ltd.....	535 Georgia St. W., Vancouver.....	Cariboo Dist.
Powell, Julius.....	Barkerville.....	Cariboo Dist.
Silta & Hafberg.....	Fort St. James.....	Omineca Mining Div.
Slade-Cariboo Gold Placers, Ltd.....	1410 Hoge Bldg., Seattle, Wash., U.S.A.....	Barkerville.
Slate Creek Cons. Placers, Ltd.....	709 Dominion Bank Bldg., Vancouver.....	Silkikameen Dist.
Sundberg, Magnus.....	Cottonwood.....	Barkerville.
Trehouse Hydraulic.....	Barkerville.....	Cunningham Creek.
Turnquist, Emil.....	Atlin.....	Ruby Creek.
Tyughton Creek Gold Placers, Ltd.....	118 Vancouver Block, Vancouver.....	Lillooet Dist.
Wissler, Westenhiser & Grinder.....	Likely.....	Cariboo Dist.
YUKON—		
Holbrook Dredging Co.....	Glacier Creek.....	Sixty Mile Creek.
McDonald, McCormick & Stewart.....	Glacier Creek.....	Miller Creek.
The Yukon Consolidated Gold Corp., Ltd.....	Victoria Bldg., Ottawa, Ont.....	Klondyke Mining Div.

Auriferous Quartz Mining Industry

NOVA SCOTIA—		
*Forest, Alton.....	Caledonia.....	Queens Co.
Hall, Neil.....	367 Morris St., Halifax.....	Tangier.
*Hants Gold Mines, Ltd.....	Central Rawdon.....	Hants Co.
Higgins & Lawlor.....	Moose River.....	Halifax Co.
*Hyland, Thos. L.....	Fairview.....	Dutch Village.

DIKECTORY OF FIRMS—Continued

Name	Head office address	Location
Auriferous Quartz Mining Industry—Continued		
*Lacey Gold Mining Co., Ltd.	35 Bedford Row, Halifax	Chester Basin.
*Locarno Gold Mines, Ltd.	34 Murray St., Ottawa, Ont.	Goldboro.
*Montague Gold Mines, Ltd.	100 Adelaide St. W., Toronto, Ont.	Halifax Co.
Reynolds, W. S.	Upper Musquodoboit	Killag.
Seal Harbour Gold Mines	Goldboro.	Goldboro.
*Wambolt & Dukeshire	Caledonia	N. Brookfield.
NEW BRUNSWICK—		
*Somers, Wilbur	Halcomb	Northumberland Co.
QUEBEC—		
*Adanac Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Rouyn Dist.
*Arcadian Rouyn Gold Mines Syndicate, Ltd.	105 Mountain Hill, Quebec	Rouyn Tp.
*Arno Mines, Ltd.	63 Sparks St., Ottawa, Ont.	Rouyn Tp.
*Arntfield Mining Syndicate, Ltd.	159 Bay St., Toronto, Ont.	Boischatel Tp.
*Arntfield Gold Mines, Ltd.	303 Old Birks Bldg., Montreal	Boischatel Tp.
*Basin Gold Mines, Ltd.	31 St. James St. W., Montreal	Dubuisson Tp.
*Beattie Gold Mines, Ltd.	100 Adelaide St. W., Toronto, Ont.	Duparquet Tp.
*Bellehumeur Mining Co., Ltd.	c/o National Trust Co., 153 St. James St., Montreal	Laverlochère Tp.
Bussières Mining Co., Ltd.	211 Notre Dame St. W., Montreal	Louvicourt Tp.
*Canadian Gold Operators, Ltd.	276 St. James St., Montreal	Cadillac Tp.
*Canadian Malartic Gold Mines, Ltd.	Hull	Fournier Tp.
*Canadian Pandora Gold Mines, Ltd.	New Liskeard, Ont.	Cadillac Tp.
*Dorval Siscoe Gold Mines, Ltd.	General Assurance Bldg., Toronto, Ont.	Varsan Tp.
*Dunlop Consolidated Mines, Ltd.	19 Melinda St., Toronto, Ont.	Louvicourt Tp.
*East Rouyn Gold Mines, Ltd.	Royal Bank Bldg., Toronto, Ont.	Rouyn Tp.
*Eclipse Gold Mining Co., Ltd.	201 Notre Dame St. W., Montreal	Destor Tp.
*Farrell Rouyn Mines, Ltd.	1610 Concourse Bldg., Toronto, Ont.	Rouyn Tp.
*Galatea Gold Mines, Ltd.	1104 Bank of Hamilton Bldg., Toronto, Ont.	Duparquet Tp.
*Granada Gold Mines, Ltd.	204 Royal Bank Bldg., Toronto, Ont.	Rouyn Tp.
*Greene-Stabell Mines, Ltd.	1406 Concourse Bldg., Toronto, Ont.	Dubuisson Tp.
*Herbin Lake Gold Syndicate, Ltd.	General Assurance Bldg., Toronto, Ont.	Bourlamaque Tp.
*Horlake Mining Corp.	Castle Bldg., Montreal	Rouyn Tp.
*Lamaque Gold Mines, Ltd.	Amos	Bourlamaque Tp.
*Mabell Mines, Ltd.	202 Notre Dame St. W., Montreal	Louvicourt Tp.
*MacDonald Gold Mines, Ltd.	Elmira, Ont.	Duparquet Tp.
*McWatters Gold Mines, Ltd.	Haileybury, Ont.	Rouyn Tp.
*Malrobie Mines, Ltd.	Excelsior Life Bldg., Toronto, Ont.	Malartic Tp.
*Maple Leaf Mines, Ltd.	500 Dominion Bldg., Toronto, Ont.	
*Maritime Cadillac Syndicate	Moncton, N.B.	Cadillac Tp.
*Mathews Gold Mine, Ltd.	Kirkland Lake, Ont.	Pascal Tp.
*Minrand Gold Mine, Ltd.	231 St. James St. W., Montreal	Dubuisson Tp.
*Mines Development Corp.	189 rue St. Jean, Quebec	Launay Canton.
*Normont Gold Mines, Ltd.	905 Transportation Bldg., Montreal	Rouyn Tp.
*Northern Aerial Canada Golds, Ltd.	1406 Concourse Bldg., Toronto, Ont.	
*Northern Quebec Gold Fields & Exploration Co.	Three Rivers	Bousquet Tp.
*Northern Quebec Gold Mines, Ltd.	611 Dominion Square Bldg., Montreal	Rouyn Tp.
*O'Brien & Fowler, Ltd.	140 Wellington St., Ottawa, Ont.	Cadillac Tp.
*O'Leary Malartic Mines, Ltd.	Box 489, Rouyn	Malartic Tp.
*Osisko Lake Mines, Ltd.	100 Adelaide St. W., Toronto, Ont.	Rouyn Tp.
*Quebec Eureka Gold Syndicate	11 King St. W., Toronto, Ont.	Tiblenmont Tp.
*Quebec Gold Belt Mines, Ltd.	Box 190, Fort Erie, Ont.	Bourlamaque Tp.
*Quebec Gold Mining Corp.	221 Notre Dame St. W., Montreal	N.W. Quebec.
*Randall Mines Corp.	221 Notre Dame St. W., Montreal	N.W. Quebec.
*Read-Authier Mines, Ltd.	112 St. James St. W., Montreal	Bourlamaque Tp.
*Siscoe Gold Mines, Ltd.	905 Dominion Square Bldg., Montreal	Dubuisson and Varson Tps.
*Sladen-Malartic Mines, Ltd.	63 Sparks St., Ottawa, Ont.	N.W. Quebec.
*South Tiblenmont Mines, Ltd.	53 King St. W., Toronto, Ont.	Abitibi Co.
*Stadacona Rouyn Mines, Ltd.	Tramways Bldg., Craig St., Montreal	Rouyn
*Stanley Siscoe Extension Gold Mines, Ltd.	New Star Bldg., Montreal	Varsan Tp.
*Standard Gold Mine	Amos	Bourlamaque Tp.
*Sullivan Cons. Mines, Ltd.	1207 Aldred Bldg., Montreal	Dubuisson Tp.
*Thompson Cadillac Mining Co., Ltd.	212 Kesler Bldg., Montreal	Cadillac Tp.
*Tiblenmont Island Mining Co.	Senneterre	Cadillac Tp.
*Tonawanda Mines, Ltd.	Notre Dame du Nord	Tiblenmont Tp.
*Trinidad Mines, Gas & Oil Co., Ltd.	116 Cote de la Montagne, Quebec	Northern Quebec.
*Twin Lakes Mining Corp.	59 St. James St. W., Montreal	Boischatel Tp.
*West McWatters Syndicate, Ltd.	100 Adelaide St. W., Toronto, Ont.	Rouyn Tp.
*Wiltsey Coghlan Mines, Ltd.	25 King St. W., Toronto, Ont.	Rouyn Tp.
ONTARIO—		
*Amalgamated Gold Fields Corp., Ltd.	1104 Northern Ontario Bldg., Toronto	Beatty Tp.
*Anglo-Huronian (Vipond)	80 King St. W., Toronto	Porcupine area.
*Ashley Gold Mining Corp., Ltd.	350 Bay St., Toronto	Bannockburn Tp.
*Atlas Mine	64 Wellington St. W., Toronto	West Shining Tree.
*Barry Hollinger Mines, Ltd.	57 Bloor St. W., Toronto	Boston Creek.
*Bidgood Kirkland Gold Mines, Ltd.	32 Main St. E., Hamilton	Lebel Tp.
*Buffalo Ankerite Gold Mines, Ltd.	1005 Stock Exchange Bldg., Buffalo, N.Y., U.S.A.	
*Canadian Kirkland Mines, Ltd.	171 Yonge St., Toronto	Deloro Tp.
*Canadian Reserve Mines, Ltd.	C.P.R. Bldg., Toronto	Teck Tp.
*Casey Summit Gold Mines, Ltd.	Sioux Lookout (via)	Larder Lake.
		Summit Lake.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Auriferous Quartz Mining Industry—Continued		
Ontario—Concluded.		
*Central Patricia Gold Mines, Ltd.	85 Richmond St. W., Toronto	Dist. of Patricia.
*Cole Gold Mines, Ltd.	Red Lake	Red Lake.
*Cordova Mines	840 Dominion Square Bldg., Montreal, Que.	Peterboro Co.
*Chester Gold Mines	320 Bay St., Toronto	Schumacher.
Coniaurum Mines, Ltd.	100 Adelaide St. W., Toronto	South Porcupine.
Dome Mines, Ltd.	36 Toronto St., Toronto	Porcupine area.
De Santis Gold Mining Co., Ltd.	Box 1299, Timmins	Rainy River.
Foley Syndicate	57 Bloor St., Toronto	Kenogami Lake.
*Four Nations Cons. Gold Mines Syndicate	372 Bay St., Toronto	Halcrow Tp.
*Halcrow Swayze Mines, Ltd.	25 King St. W., Toronto	Narrow Lake.
High Grade Syndicate	Narrow Lake	Timmins.
Hollinger Consolidated Gold Mines, Ltd.	Timmins	Timmins.
*Horseshoe Mines, Ltd.	302 Royal Bank Bldg., Toronto	Kenora Dist.
Howey Gold Mines, Ltd.	Red Lake	Red Lake.
*J. M. Consolidated Mines, Ltd.	1116 Federal Bldg., Toronto	Patricia Dist.
*Kenty Gold Mines, Ltd.	43 Victoria St., Toronto	Swayze Tp.
Kirkland Gateway Gold Mine	Swastika	Swastika.
Kirkland Lake Gold Mining Co., Ltd.	Bank of Commerce Bldg., Toronto	Kirkland Lake.
Lake Shore Mines, Ltd.	Kirkland Lake	Kirkland Lake.
*Lakeland Gold Mines, Ltd.	Sun Life Bldg., Hamilton	Maisonville Tp.
*Little Long Lac Gold Mines, Ltd.	15 King St. W., Toronto	Geraldton.
Macassa Mines, Ltd.	85 Richmond St. W., Toronto	Kirkland Lake.
Marboun Gold Mines, Ltd.	902 Lumsden Bldg., Toronto	Deloro Tp.
*Matachewan Cons. Mines, Ltd.	100 Adelaide St. W., Toronto	Matachewan.
*McCarthy-Webb Goudreau Mines, Ltd.	501 C.P.R. Bldg., Toronto	Goudreau.
McIntyre Porcupine Mines, Ltd.	15 King St. W., Toronto	Schumacher.
*McKenzie Red Lake Gold Mines, Ltd.	509 National Bldg., Bay St., Toronto	Patricia Dist.
*McMillan Gold Mines, Ltd.	52 Elm St., Sudbury	Mongowin Tp.
*Metropolitan Gold Mines, Ltd.	314 Metropolitan Bldg., Toronto	Savant Lake.
Minto Gold Mines, Ltd.	Wawa	Wawa.
Moss (Ardeen) Gold Mines, Ltd.	132 St. James St. W., Montreal, Que.	Kashabowie.
*Munroe-Croesus Mines, Ltd.	Haileybury	Matheson.
*Northern Aerial Canada Golds, Ltd.	1406 Concourse Bldg., Toronto	Pickle Lake.
*Northern Empire Mines Co., Ltd.	Empire	Empire.
*Northern Metals, Ltd.	1440 St. Catherine St. W., Montreal, Que.	Katrine Tp.
Parkhill Gold Mines, Ltd.	212 Keefer Bldg., Montreal, Que.	Wawa.
*Palaris Gold Mines of Canada, Ltd.	Timmins	Porcupine area.
*Saundary Syndicate	Mine Centre	Mine Centre.
*St. Anthony Gold Mines, Ltd.	19 Melinda St., Toronto	Thunder Bay Dist.
Soo Mining & Prospecting Syndicate	450 Queen St. E., Sault Ste. Marie	Holdsworth.
Sylvanite Gold Mines, Ltd.	Kirkland Lake	Kirkland Lake.
Teck-Hughes Gold Mines, Ltd.	Kirkland Lake	Kirkland Lake.
Toburn Gold Mines, Ltd.	Kirkland Lake	Kirkland Lake.
*Wawa Goldfields, Ltd.	437 St. James St. W., Montreal, Que.	Wawa.
White, Lilly	c/o Smith Bros., Fort Francis	Kowene.
White Rock Mining Co.	Frawley Block, Sudbury	Shining Tree.
Wright-Hargreaves Mines, Ltd.	Fort Erie North	Kirkland Lake.
MANITOBA		
Central Manitoba Mines, Ltd.	Paris Bldg., Winnipeg	Long Lake Dist.
Consolidated Goldfields of Manitoba, Ltd.	941 Somerset Bldg., Winnipeg	Rice Lake Dist.
Dinse, A.	Flin Flon	N.W. Manitoba.
*Diana Gold Mines, Ltd.	c/o Doran Securities, Bank of Hamilton Bldg., Toronto, Ont.	Long Lake Dist.
*East God's Lake Gold Mines, Ltd.	297 Bay St., Toronto, Ont.	God's Lake.
*Garry Gold Mines, Ltd.	204 Royal Bank Bldg., Toronto, Ont.	God's Lake Dist.
*God's Lake Gold Mines, Ltd.	395 Main St., Winnipeg	God's Lake.
*Island Lake Mines, Ltd.	395 Main St., Winnipeg	Island Lake area.
*Maskwa Lake Gold Mines, Ltd.	701 Great West Permanent Bldg., Winnipeg.	Maskwa Lake.
North British Mining & Milling	The Pas	Herb Lake.
Oro Grande Development Co., Ltd.	1208 McArthur Bldg., Winnipeg	Rice Lake area.
San Antonio Gold Mines, Ltd.	237 Curry Bldg., Winnipeg	Rice Lake area.
Vanson Gold Mines, Ltd.	209 Bank of Nova Scotia Bldg., Winnipeg	Rice Lake area.
Warren, F. G.	Flin Flon	Fay Lake.
*Wilson Gold Mines, Ltd.	Sylvester-Wilson Bldg., Winnipeg	Long Lake.
SASKATCHEWAN—		
*Amisk Gold Syndicate, Ltd.	55 Broad St. Ave., London, E.C. 2, England	Amisk Lake.
*Graham, Robert.	Box 426, The Pas, Man.	Amisk Lake.
BRITISH COLUMBIA—		
*Alaska Juneau Gold Mining Co.	Juneau, Alaska	Tulsequah River.
Arlington Mine	Nelson	Erie.
*B.C. Cariboo Gold Fields, Ltd.	919 Stock Exchange Bldg., Vancouver	Lillooet Mining Div.
Bralorne Mines, Ltd.	555 Burrard St., Vancouver	Lillooet Mining Div.
*B. R. Mountain Golds, Ltd.	800 Hall Bldg., Vancouver	Lillooet Mining Div.
*B. R. X. Gold Mines, Ltd.	475 Howe St., Vancouver	Bridge River.
*Buena Vista Mining Co., Ltd.	Trail	Stewart.
Canada Smelters, Ltd.	Sanca	East Kootenay.
Canadian American Mines, Ltd.	804 Standard Bank Bldg., Vancouver	Carmi.
*Cariboo-Bridge River Gold Properties, Ltd	425 Howe St., Vancouver	Lillooet Mining Div.
Cariboo Gold Quartz Mining Co., Ltd.	615 Bower Bldg., Vancouver	Barkerville.
*Cariboo Mountain Gold Mines, Ltd.	Bank of Toronto Bldg., Victoria	Cariboo Dist.
Carmichael, A. (Oliver mine)	Oliver	Oliver.
Crossley, Brodie & Burns (Bunker Hill)	Nelson	Nelway.

DIRECTORY OF FIRMS—Continued

Auriferous Quartz Mining Industry—Concluded

Name	Head office address	Location
*Dentonia Mines, Ltd.	407 Lancaster Bldg., Calgary	Similkameen.
Dunwell Mines, Ltd.	Stewart.	Stewart.
Engineer Mine (R. Brook)	Atlin.	Atlin.
Evening Star Leasing Syndicate	Box 41, Rossland.	Rossland.
Poster Ledge Gold Mines, Ltd.	816 Hall Bldg., Vancouver.	
*Gem Gold Mines, Ltd.	955 Thurlow St., Vancouver.	Texada Island.
Georgia Leasing Syndicate	Box 41, Rossland.	Rossland.
Glacier Gulch (S. F. Campbell)	Box 21, Smithers.	Omineca.
*Gold Belt Mining Co., Ltd.	304 Stock Exchange Bldg., Vancouver.	Salmo.
*Gold Drop (W. E. McArthur, Jr.)	Greenwood.	Greenwood.
*Goldfinch Gold Mines, Ltd.	320 Pemberton Bldg., Victoria.	Camborne.
*Gold Peak Gold Mines, Ltd.	714 Standard Bank Bldg., Vancouver.	Bridge River.
Granby Consolidated Mining, Smelting & Power Co., Ltd.	Hall Bldg., Vancouver.	Anyox.
Grandora Mining & Milling Co., Ltd.	Box 474, Penticton.	Penticton.
*Grange Mines, Ltd.	921 Georgia Hotel, Vancouver.	Pavilion Mt.
*Gruhl-Winkne Gold Mines, Ltd.	1007 Royal Bank Bldg., Vancouver.	Bridge River Dist.
*Hackney, S. J.	Box 527, Rossland.	Trail Creek Mining Div.
*Haida Gold Mines, Ltd.	812 Standard Bank Bldg., Vancouver.	Moresby Island.
*Helena Gold Mines, Ltd.	308 Stock Exchange Bldg., Vancouver.	Georgia River.
*Holland Gold Mines, Ltd.	312 Standard Bank Bldg., Vancouver.	Lillooet Mining Div.
*Home Gold Mining Co., Ltd.	553 Granville St., Vancouver.	Jessica.
Jack Paul Mining Co.	608 Peyton Bldg., Spokane, Wash., U.S.A.	Kettle River.
Kootenay Belle Gold Mines, Ltd.	902 Rogers Bldg., Vancouver.	Salmo.
*Mak Siccar Gold Mines, Ltd.	124 Pacific Bldg., Vancouver.	Osoyoos Mining Div.
McFadden, Thomey & Murr (Spider group)	Stewart.	Portland Canal.
*Meridian Mining Co., Ltd.	64 Leigh Spencer Bldg., Vancouver.	Camborne.
Midnight Syndicate	Rossland.	Trail Creek Mining Div.
*Minto Gold Mines, Ltd.	Bridge River.	Lillooet Mining Div.
*Mix Gold Mines, Ltd.	415 Hall Bldg., Vancouver.	Bridge River Dist.
Molly Gibson Mine (Oscar Anderson)	Rossland.	Burnt Basin.
Morning Star Gold Mines, Ltd.	Oliver.	Fairview.
Nicola Mines & Metals, Ltd.	800 Hall Bldg., Vancouver.	Stump Lake.
O. K. Leasing Co.	Box 167, Rossland.	Rossland.
Perrier Gold Mines, Ltd.	Box 1059, Nelson.	Nelson.
Pennay, M. (Gold Drip)	Rossland.	Rossland.
Pioneer Gold Mines of B.C., Ltd.	305 Rogers Bldg., Vancouver.	Lillooet Dist.
Pre Cambrian Gold Mines, Ltd.	1319 Smith Tower, Seattle, Wash., U.S.A.	Ewings Landing.
Premier Gold Mining Co., Ltd.	London Bldg., Vancouver.	Portland Canal.
Queen Mining & Milling Co.	Salmo.	Sheep Creek.
*Reliance Gold Mines.	1308 Northern Life Tower Bldg., Seattle, Washington, U.S.A.	Bridge River Dist.
Relief Arlington Mines, Ltd.	530 Howe St., Vancouver.	Nelson Mining Div.
Reno Gold Mines, Ltd.	Yorkshire Bldg., Vancouver.	Salmo.
*Richstrike Gold Mines, Ltd.	175 Howe St., Vancouver.	Bridge River.
*Sheep Creek Gold Mines, Ltd.	810 West Hastings St., Vancouver.	Salmo.
*Standard Gold Mines, Ltd.	425 Howe St., Vancouver.	Bridge River.
*Tide Lake Syndicate, Ltd.	101 Pemberton Bldg., Victoria.	Portland Canal.
The N. A. Timmins Corp. (Surf Point)	1010 Canada Cement Bldg., Montreal.	Porcher Island.
Turner, W. J. (California mine)	Nelson.	Nelson Mining Div.
Twin Lakes Gold Mining Co., Ltd.	Box 421, Penticton.	Yale Mining Div.
Vi-dette Gold Mines, Ltd.	304 Pacific Bldg., Vancouver.	Savona.
*Waterloo Gold Mines, Ltd.	Box 472, Penticton.	Grand Forks Mining Div.
*Way-side Cons. Gold Mines, Ltd.	Wayside, via Bridge River.	Bridge River.
Widdowson, E. W. (Tamarac)	Box 1108, Nelson.	Ymir.
Wilcox Mining Syndicate	Box 205, Rossland.	Ymir.
Windpass Gold Mining Co., Ltd.	608 Pacific Bldg., Vancouver.	Chu Chua.
Yankee Girl Mine	Ymir.	Ymir.
*Zeballos River Mining Co., Ltd.	512 View St., Victoria.	Clayoquot Mining Div.

*Active, but not producing.

NOTE—Complex auriferous-sulphide ores that are mined essentially for their gold content are largely classified in this report under auriferous quartz.

Copper-Gold-Silver Mining Industry

NEW BRUNSWICK—		
*Eastern Mining & Smelting Co., Ltd.	94 Prince William St., Saint John.	Adams Island.
QUEBEC—		
Aldermac Mines, Ltd.	941 Dominion Square Bldg., Montreal.	Boischatel Tp.
*Astoria Rouyn Mines, Ltd.	70 St. Paul St., Quebec.	Rouyn.
*Bagomac Rouyn Mines, Ltd.	Haileybury, Ont.	Rouyn.
*Béland, J.	St. Adolphe de Duds-well.	Marbleton.
*Brownlee Mines, Ltd.	Noranda.	Rouyn.
*Carlson Copper Syndicate	New Liskeard, Ont.	Dufay Tp.
*Chibaugamau McKenzie Mines, Ltd.	Board of Trade Bldg., Montreal.	Chibaugamau Dist.
*Chibaugamau Prospectors, Ltd.	276 St. James St. W., Montreal.	Louvicoourt Tp.
*Clery Cons. Mines, Ltd.	74 Sparks St., Ottawa, Ont.	Clery Tp.
Consolidated Copper & Sulphur Co.	Eustis.	Ascot Tp.
*Gagnon, Auguste.	Ste. Germaine Dorchester.	Ware Tp.
*Glenwood Mining Co., Ltd.	Rouyn.	Rouyn Tp.
Noranda Mines, Ltd.	Royal Bank Bldg., Toronto, Ont.	Rouyn.
*Normetal Mining Corp., Ltd.	350 Bay St., Toronto, Ont.	Desmeloizes Tp.
*Northwestern Quebec Prospectors	Rouyn.	Bousquet Tp.
*Pontiac Rouyn Mines, Ltd.	59 Yonge St., Toronto, Ont.	Rouyn Tp.

DIRECTORY OF FIRMS—Continued

Copper-Gold-Silver Mining Industry—Concluded

Name	Head office address	Location
ONTARIO— Amity Copper & Gold Mines, Ltd.....	1302 Canada Permanent Bldg., Toronto.....	Boston Creek.
MANITOBA— Hudson Bay Mining & Smelting Co., Ltd....	404 Dundas St., Woodstock, Ont.....	Flin Flon.
SASKATCHEWAN— Hudson Bay Mining & Smelting Co., Ltd....	404 Dundas St., Woodstock, Ont.....	Flin Flon.
Symon, A.....	Flin Flon.....	Beaver Lake.
BRITISH COLUMBIA— Britannia Mining & Smelting Co., Ltd.....	Britannia Beach.....	Britannia Beach.
*The Coast Copper Co., Ltd.....	Trail.....	Jeune Landing.
The Granby Consolidated Mining, Smelting & Power Co., Ltd.....	Hall Bldg., Vancouver.....	Anyox.
Meldrum, J. M. (Hunter group).....	1241 East 13th Ave., Vancouver.....	Khutze Inlet.
*Sunloch Mines, Ltd.....	Trail.....	Jordan River Dist.
Velvet Gold Mining Co., Ltd.....	1309 7th Ave., Seattle, Wash., U.S.A.....	Rossland.

Chrome Ore Mining Industry

QUEBEC— Gray, E.....	Thetford Mines.....	Coleraine Tp.
*Chromium Mining and Smelting Corp., Ltd..	Collins.....	Collins.
BRITISH COLUMBIA— *Consolidated Mining & Smelting Co., Ltd....	Trail.....	Ashcroft.

*Active, but not producing.

Iron Mining Industry

NOVA SCOTIA— Dominion Steel & Coal Corporation, Ltd....	Sydney, N.S.....	Bell Island, N'f'd.
QUEBEC— Baie St. Paul Titanic Iron Ore Co.....	Baie St. Paul.....	Charlevoix Co.

Manganese Mining Industry

NOVA SCOTIA— *New Ross Manganese Syndicate.....	3 Cherry St., Halifax.....	New Ross.
--	----------------------------	-----------

*Active but not producing.

Molybdenite Mining Industry

QUEBEC— *Bain J., Estate.....	Toronto General Trusts Bldg., Ottawa.....	Masham Tp.
ONTARIO— *Varin & Bellew.....	8500 St. Hubert St., Montreal.....	Addington Co.

*Active but not producing.

Nickel-Copper Mining Industry

ONTARIO— *Cuniptau Mines Development Co., Ltd.....	465 Bay St., Toronto.....	Strathy Tp.
Falconbridge Nickel Mines, Ltd.....	100 Adelaide St. W., Toronto.....	Falconbridge Tp.
International Nickel Co. of Canada, Ltd.....	Copper Cliff.....	Sudbury Dist.
BRITISH COLUMBIA— *B.C. Nickel Mines, Ltd.....	510 Hastings St. W., Vancouver.....	Choate.

*Active but not producing.

DIRECTORY OF FIRMS—Continued

Non-Ferrous Smelting and Refining Industry

Copper Smelting Companies

Name	Head office address	Location
Noranda Mines, Ltd.....	2 King St. E., Toronto.....	Noranda.
†International Nickel Co. of Canada, Ltd.....	67 Wall St., New York City, U.S.A.....	Copper Cliff and Coniston.
†Falconbridge Nickel Mines, Ltd.....	100 Adelaide St. W., Toronto.....	Falconbridge.
Hudson Bay Mining & Smelting Co., Ltd.....	404 Dundas St., Woodstock.....	Flin Flon.
Granby Consolidated Mining, Smelting & Power Co., Ltd.....	789 Pender St. W., Vancouver.....	Anyox.

Electrolytic Copper Refining Companies

Canadian Copper Refiners, Ltd.....	2 King St. E., Toronto.....	Montreal East.
Ontario Refining Co., Ltd.....	Copper Cliff.....	Copper Cliff.

Lead Smelting and Refining Companies

*Consolidated Mining & Smelting Co. of Canada, Ltd.....	Dominion Square Bldg., Montreal.....	Trail.
---	--------------------------------------	--------

Electrolytic Zinc Refining Companies

†Consolidated Mining & Smelting Co. of Canada, Ltd.....	Dominion Square Bldg., Montreal.....	Trail.
†Hudson Bay Mining and Smelting Co., Ltd....	404 Dundas St., Woodstock.....	Flin Flon.

Smelters and Refiners of Cobalt-Silver-Arsenic Ores

*Deloro Smelting & Refining Co., Ltd.....	Deloro.....	Deloro.
---	-------------	---------

Refiners of Uranium-Radium Ores

Eldorado Gold Mines, Ltd.....	Star Bldg., Toronto	Port Hope.
-------------------------------	---------------------------	------------

Producers of Primary Aluminium

Aluminum Company of Canada, Ltd.....	Canada Life Bldg., Toronto.....	Arvida and Shawinigan Falls
--------------------------------------	---------------------------------	-----------------------------

Silver-Cobalt Mining Industry

ONTARIO—		
Beaver Mine.....	Box 386, Cobalt.....	Coleman Tp.
Brocklebank, A.....	c/o Kerr Lake Mining Co., 61 Broadway, New York City, U.S.A.....	Cobalt.
Cobalt Properties, Ltd.....	Cobalt.....	Cobalt.
Jemmet, D. L., Estate of.....	1305 Metropolitan Bldg., Toronto.....	Bucke Tp.
McKinley Mines Securities Co., Ltd.....	12th Floor, 80 King St. W., Toronto.....	Cobalt.
Mining Corporation of Canada, Ltd.....	350 Bay St., Toronto.....	Cobalt.
The Nipissing Mining Co., Ltd.....	Excelsior Life Bldg., Toronto.....	Cobalt.
O'Brien, M. J., Ltd.....	Victoria Bldg., Ottawa.....	Cobalt and Gowganda.
Peterson Cobalt Mines, Ltd.....	301 Royal Bank Bldg., Toronto.....	Cobalt.
Piutkowski, J., and Powletti, Arnaldo.....	Box 65, Cobalt.....	Cobalt.
Price, C. W.....	Box 388, Cobalt.....	Cobalt.
Sandoe & Moyle.....	Box 362, Cobalt.....	Cobalt.

†Smelt nickel-copper ores.

*Produce bismuth or bismuth-bearing bullion as by-products.

†Produce cadmium or cadmium compounds as by-products.

DIRECTORY OF FIRMS—Continued

Silver-Lead-Zinc Mining Industry

Name	Head office address	Location
QUEBEC—		
*Federal Zinc & Lead Co., Ltd.	608 Drummond Bldg., Montreal	Gaspé Co.
*Lyall & Beidelman	608 Drummond Bldg., Montreal	Gaspé Co.
*Trinidad Mines Gas & Oil, Ltd.	116 Côte de la Montagne, Quebec	Chavigny and Montauban counties.
BRITISH COLUMBIA—		
Base Metals Mining Corp., Ltd.	Suite 602, 350 Bay St., Toronto, Ont.	Field.
B. C. Cariboo Gold Fields, Ltd.	919 Stock Exchange Bldg., Vancouver	Moyie.
Beaver Silver Mines, Ltd.	708-525 Seymour St., Vancouver	Beaverdell.
Beaverdell Wellington Syndicate, Ltd.	Greenwood	Beaverdell.
Bell Mine, Ltd.	Box 464, Penticton	Beaverdell.
Campbell, C. J.	New Denver	Slocan M.D.
Camp McKinney Gold Hill Mining Co., Ltd.	703 Dominion Bldg., Vancouver	Greenwood M.D.
*Columario Cons. Gold Mines, Ltd.	507 Confederation Life Bldg., Toronto, Ont.	Usk.
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail	Kimberley.
Doney, E., and Son	Box 17, Sandon	Slocan.
Goodenough Mines	Kaslo	Slocan.
Henderson, R. G.	Slocan City	Slocan City.
Highland Lass, Ltd.	Box 782, Kelowna	Beaverdell.
*Jessie Gold Mines, Ltd.	Box 3, Smithers	Smithers.
Jordan, Calder & Jordan	Edgewood	Lightning Peak.
Keystone Mine	Erie	Nelson Dist.
McArthur, W. E., Jr.	Greenwood	Similkameen Dist.
*Michael Silver-Lead Mines, Ltd.	Trail	Salmon River.
McCarthy, James F.	Grand Forks	Kettle River.
Molly Hughes, Ltd.	N. 318 Division St., Spokane, Wash., U.S.A.	New Denver.
*Noble Five Mines, Ltd.	420 Baker St., Nelson	Slocan and Nelson M.D.
Nordman, J. L.	Beaverdell	Beaverdell.
Olsen, A. R., and O. J.	Box 75, Sandon	Sandon.
Pool Mountain Gold Mines, Ltd.	1320 Marine Bldg., Vancouver	Camborne.
Roberts W. Rees & Co.	Silverton	W. Kootenay.
Ruth-Hope Mining Co., Ltd.	804 Stock Exchange Bldg., 475 Howe St., Vancouver	Sandon.
Sally Mines, Ltd.	Box 220, Penticton	Beaverdell.
Sargeant, T. H., and Saunderson, H.	Box 1863, Trail	Nelson M.D.
Saur Marzoli	Retallack	Slocan M.D.
*Stemwinder Mountain Mines, Ltd.	902 Birks Bldg., Vancouver	Hedley.
*United Empire Gold & Silver Mining Co., Ltd.	Standard Bank Bldg., Vancouver	Portland Canal.
Western Exploration Co., Ltd.	Silverton	Kaslo.
YUKON—		
Treadwell Yukon Co., Ltd.	920 Crocker Bldg., San Francisco, California, U.S.A.	Mayo M.D.
NORTHWEST TERRITORIES†—		
*Bear Exploration & Radium, Ltd.	217 Bay St., Toronto, Ont.	Great Bear Lake.
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail, B.C.	Great Bear Lake.
Eldorado Gold Mines, Ltd.	Star Bldg., Toronto, Ont.	Great Bear Lake.
*Great Bear Lake Mines, Ltd.	Imperial Bank Bldg., Toronto, Ont.	Great Bear Lake.
*White Eagle Silver Mines, Ltd.	1006 Concourse Bldg., Toronto, Ont.	Camsell River area.

*Active but not producing.

†Chiefly developing pitchblende or pitchblende silver ores.

NOTE.—Based on the value of the gold content of their ores some important silver-lead producers are classified as gold mines and as such are listed under the Gold Mining Industry.

Tungsten Mining Industry

NOVA SCOTIA—		
*Indian Path Mines, Ltd.	605 Dennis Bldg., Halifax	Lunenburg.

*Active but not producing.

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Head office address	Location District
NOVA SCOTIA—		
Acadia Coal Co., Ltd.	Stellarton	Pictou.
Bras d'Or Coal Co., Ltd.	Little Bras d'Or Bridge	Cape Breton.
Cumberland Railway & Coal Co., Ltd.	Springhill	Cumberland.
Dominion Coal Co., Ltd.	Sydney	Cape Breton.
Fundy Coal Co., Ltd.	Amherst	Cumberland.
Greenwood Coal Co., Ltd.	New Glasgow	Pictou.
Indian Cove Coal Co., Ltd.	Sydney Mines	Cape Breton.
Intercolonial Coal Co., Ltd.	Westville	Pictou.
Inverness Imperial Coal Co., Ltd.	Inverness	Inverness.
Maritime Coal, Railway & Power Co., Ltd.	Amherst	Cumberland.
North Sydney Collieries, Ltd.	North Sydney	Cape Breton.
Nova Scotia Steel & Coal Co., Ltd.	Sydney	Cape Breton.
Standard Coal Co., Ltd.	River Hebert	Cumberland.
Victoria Coal Co., Ltd.	New Glasgow	Cumberland.
NEW BRUNSWICK—		
Avon Coal Co., Ltd.	St. John	Queens.
Evans, W. B.	Minto	Queens.
King, Gerald H.	Chipman	Queens.
Minto Coal Co., Ltd.	Minto	Queens.
Miramichi Lumber Co., Ltd.	Minto	Queens.
Welton, Harvey	Minto	Queens.
Welton & Henderson, Ltd.	Minto	Queens.
SASKATCHEWAN—		
Anderson, N.	Estevan	<i>Municipality</i> Near Estevan.
Banks, H.	Taylorlton	Near Pinto.
Baniulis Bros.	Roche Percee	Roche Percee.
Bienfait Commercial Co.	Bienfait	Near Bienfait.
Bienfait Mines, Ltd.	Bienfait	Near Bienfait.
Crescent Collieries, Ltd.	Bienfait	Near Bienfait.
Eastern Collieries of Bienfait, Ltd.	Estevan	Near Bienfait.
Edwardson, A. (Sinclair Mine).	Roche Percee	Roche Percee.
Galloway, John	Estevan	Near Estevan.
Jenish Bros.	Estevan	Near Estevan.
Lignite Coal Mines, Ltd.	Taylorlton	Near Taylorlton.
Manitoba & Saskatchewan Coal Co., Ltd.	503 Avenue Block, Winnipeg, Man.	Near Bienfait (Taylorlton).
Moose Jaw Coal Mine, Ltd.	Regina	Near Leakville.
Parkinson, George	Estevan	Near Estevan.
Poage, H. E.	Roche Percee	Roche Percee.
Shand Coal & Brick Co.	Shand	Shand.
Truax Traer Coal Co., Ltd.	Estevan	Near Estevan.
Uhrich & Mitheson	Taylorlton	Taylorlton.
Western Dominion Collieries, Ltd.	Taylorlton	Taylorlton.
ALBERTA—		
Bituminous—		
Braceau Collieries, Ltd.	Nordegg	Nordegg.
Cadomin Coal Co., Ltd.	Cadomin (mine office), Edmonton (business office).	Mountain Park.
Canmore Coal Co., Ltd.	Canmore	Cascade.
Hillcrest Collieries, Ltd.	Hillcrest	Crowsnest.
International Coal & Coke Co., Ltd.	Coleman	Crowsnest.
Luscar Collieries, Ltd.	Edmonton	Mountain Park.
McGillivray Creek Coal & Coke Co., Ltd.	Coleman	Crowsnest.
Mohawk Bituminous Mines, Ltd.	Bellevue	Crowsnest.
Mountain Park Collieries, Ltd.	410 Tegler Bldg., Edmonton	Mountain Park.
West Canadian Collieries, Ltd.	Blairmore	Crowsnest.
Sub-bituminous—		
Alexo Coal Co., Ltd.	Alexo	Saunders.
Bighorn & Saunders Creek Collieries, Ltd.	Saunders	Saunders.
Bryan Coal Co., Ltd.	Edmonton	Coalspur.
Coal Valley Mining Co., Ltd.	Coal Valley	Coalspur.
Foothills Collieries, Ltd.	Foothills	Coalspur.
Hinton Collieries, Ltd.	Hinton	Prairie Creek.
Jasper Coal Co., Ltd.	Edmonton	Prairie Creek.
Lakeside Coal, Ltd.	Edmonton	Coalspur.
McLeod River Hard Coal Co., Ltd.	Mercoal	Coalspur.
Sterling Collieries, Ltd.	Edmonton	Coalspur.
Lignite—		
Aetna Coal Co., Ltd.	Drumheller	Drumheller.
Alberta Block Coal Co., Ltd.	Drumheller	Drumheller.
Atlas Coal Co., Ltd.	East Coulee	Drumheller.
Balogh Coal Co., Ltd.	Carbon	Carbon.
Beverley Coal Co., Ltd.	Edmonton	Edmonton.
Brilliant Coal Co., Ltd.	Drumheller	Drumheller.
Bush Mines, Ltd.	Edmonton	Edmonton.
Cadillac Coal Co., Ltd.	Lethbridge	Lethbridge.
Canadian Dinant Coal Co., Ltd.	Dinant	Camrose and Carbon.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Concluded

Name	Head office address	Location District
ALBERTA—Concluded		
<i>Lignite—Concluded</i>		
Canadian Pacific Railway Co.	Dept. of Natural Resources, Calgary	Lethbridge.
City of Lethbridge Coal Mines	Lethbridge.	Lethbridge.
Coal Producers, Ltd.	Calgary	Lethbridge and Pembina.
Dawson Coal Co., Ltd.	Edmonton.	Edmonton.
Edina Coal Co., Ltd.	Edmonton.	Edmonton.
Elgin Coal Co., Ltd.	Drumheller.	Drumheller.
Empire Collieries, Ltd.	East Coulee.	Drumheller.
Excelsior Collieries, Ltd.	Wayne.	Drumheller.
Fireside Coal Co., Ltd.	Drumheller.	Drumheller.
Fraser-Mackay Collieries, Ltd.	10055-101st St., Edmonton.	Edmonton.
Fridel Red Hot Coal Co.	Edmonton.	Edmonton.
Gibb, W. E.	Edmonton.	Edmonton.
Great West Coal Co., Ltd (Black Diamond Mine)	Edmonton.	Edmonton.
Great West Coal Co., Ltd. (Star Mine)	Aerial.	Drumheller.
Gunderson Brick & Coal Co., Ltd.	Redcliff.	Redcliff.
Hy-Grade Coal Co. of Drumheller, Ltd.	Drumheller.	Drumheller.
Ideal Coal Co., Ltd.	Wayne.	Drumheller.
Jewel Collieries, Ltd.	Wayne.	Drumheller.
Keith & Fulton Coal Co.	Edmonton.	Edmonton.
Kleenbirn Collieries, Ltd.	Eyremore.	Brooks.
Lakeside Coals, Ltd.	Edmonton.	Pembina.
Larson, J. L.	Wheat Centre.	Brooks.
Leavell Coal Co., Ltd.	Sheerness.	Sheerness.
Lund, Nelson & Degaust.	Lethbridge.	Lethbridge.
Maple Leaf Minerals, Ltd.	Drumheller.	Drumheller.
Marcus Coal Mines, Ltd.	Edmonton.	Edmonton.
McDonnell & Gwilliam.	Namoo.	Edmonton.
Midland Coal Mining Co., Ltd.	Midlandvale.	Drumheller.
Minute Coal Co.	Drumheller.	Drumheller.
Murray Collieries, Ltd.	East Coulee.	Drumheller.
Newcastle Coal Co., Ltd.	Drumheller.	Drumheller.
Oliphant, John.	Medicine Hat.	Redcliff.
Oliphant, J. H.	Carbon.	Carbon.
Ottewell Coal Co.	Clover Bar.	Edmonton.
Parker, L.	Cardiff.	Edmonton.
Peerless Carbon Collieries	Carbon.	Carbon.
Penn Coals, Ltd.	Edmonton.	Edmonton.
Rollingson, J.	Lethbridge.	Lethbridge.
Rosedale Coal Co., Ltd.	Rosedale.	Drumheller.
Rose Deer Coal Mining Co., Ltd.	Wayne.	Drumheller.
Royal Lethbridge Collieries	Lethbridge.	Lethbridge.
Sinoski, M.	Strathcona.	Edmonton.
Sovereign Coal Mining Co., Ltd.	Wayne.	Drumheller.
Stoney Creek Collieries, Ltd.	Camrose.	Camrose.
Super Heat Coal Co.	Ardley.	Ardley.
Superior Grade Coal Co., Ltd.	Wayne.	Drumheller.
Thomas Coal Co., Ltd., The.	Drumheller.	Drumheller.
Tofield Coal Co., Ltd.	Tofield.	Tofield.
Tredway & Co.	Dodds.	Tofield.
Western Gem Coal Co., Ltd.	Drumheller.	Drumheller.
BRITISH COLUMBIA—		
Canadian Collieries (Dunsmuir), Ltd.	Nanaimo.	Island.
Coalmont Collieries, Ltd.	Coalmont.	Inland.
Corbin Collieries, Ltd.	Corbin.	Crow's Nest Pass.
Crow's Nest Pass Coal Co., Ltd.	Fernie.	Crow's Nest Pass.
Middlesboro Collieries, Ltd.	Merritt.	Inland.
Pleasant Valley Mining Co., Ltd.	Princeton.	Inland.
Tulameen Coal Mines, Ltd.	Princeton.	Inland.
Western Fuel Corporation of Canada, Ltd.	Nanaimo.	Island.
Wilson Mining & Investment Co., Ltd.	Vancouver.	Inland.

Natural Gas Industry

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton.	Stony Creek. <i>Field</i>
†Moncton Tramway, Electricity & Gas Co., Ltd.	Moncton.	Stony Creek.
QUEBEC—		
*Canadian Seaboard Oil & Gas Co., Ltd.	39 Broadway, New York City, U.S.A.	Yamaska co.
Trinidad Mines, Gas & Oil, Ltd.	116 Cote de la Montagne, Quebec.	
ONTARIO—		
Acme Gas & Oil Co., Ltd.	350 Bay St., Toronto.	Middleton.
Aikens Gas Syndicate.	Vineland.	Canboro, Dunn and North Cayuga.
Ajax Oil & Gas Co., Ltd.	80 King St. W., Toronto.	Dover, Middleton and Tuscarora.
Amity Gas Co.	Kenmore, New York, U.S.A.	Canboro and Moulton.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—(Continued)

Name	Head office address	Location Field
ONTARIO—Concluded		
Aragain Gold & Natural Gas Syndicate.....	34 King St. E., Toronto.....	Canboro and Seneca.
Beer, Geo.....	Binbrook.....	Binbrook.
Benn, A. S.....	Hagersville.....	Walpole.
Bertie Natural Gas Syndicate.....	Selkirk.....	Bertie.
Binbrook Village Gas Co.....	Binbrook.....	Binbrook.
Border Cities Gas Syndicate.....	2½ James St. N., Hamilton.....	Onondaga.
†Brantford Gas Co.....	518 Jackson Bldg., Buffalo, N.Y., U.S.A.....	—
Broadway Gas Syndicate.....	Jarvis.....	Rainham and Walpole.
Canada Cement Co.....	Box 290, Station B, Montreal, Que.....	Wainfleet.
Canadian Natural Gas Syndicate.....	Simcoe.....	Moulton.
Canby, B. F.....	Wainfleet.....	Wainfleet.
Canfield Natural Gas Co., Ltd.....	Canfield.....	North Cayuga.
†Central Seneca Gas Syndicate.....	Cayuga.....	Seneca.
Central Pipe Line Co., Ltd.....	Chatham.....	Bayham, Houghton and Middleton.
Chippawa Development Co.....	Chippawa.....	Willoughby.
Coleman, J. A.....	Wellandport.....	Gainsboro and Wainfleet.
Colonial Natural Gas & Oil Syndicate.....	1304-5 Pigott Bldg., Hamilton.....	Canboro and Moulton.
†Columbia Natural Gas & Oil Syndicate.....	1304-5 Pigott Bldg., Hamilton.....	Dunn.
Continental Gas Corporation, Ltd.....	19 Melinda St., Toronto.....	Binbrook and Walpole.
†Culver, W. H.....	Dunnville.....	Oneida.
Cyclops Gas Syndicate.....	244 Bay St., Toronto.....	Oneida, Rainham and Walpole.
Dominion Natural Gas Co., Ltd.....	518 Jackson Bldg., Buffalo, N.Y., U.S.A.....	Bayham, Binbrook, Caistor Canboro, Charlotteville Cayuga (North and South), Dunn, Glanford, Houghton, Humberstone, Malahide, Middleton, Moulton, Oneida, Onondaga, Rainham, Seneca, Sherbrooke, Townsend, Wainfleet, Walpole, Walsingham (North and South), Windham and Woodhouse.
Dunn Natural Gas Co.....	Dunnville.....	Dunn and Sherbrooke.
Eastside Gas Co.....	Lowbanks.....	Sherbrooke.
Emerald Gas Syndicate.....	244 Bay St., Toronto.....	Moulton and Oneida.
Emerson, H.....	Dunnville.....	Canboro and Moulton.
Empire Gas & Oil Syndicate.....	18 Toronto St., Toronto.....	Walpole.
Erie Gas, Ltd.....	407 Royal Bank Bldg., Toronto.....	Woodhouse.
Fisherville Gas Co.....	Fisherville.....	Rainham.
Gifford, A. & Son.....	Cayuga.....	South Cayuga.
†Glengrove Gas Co.....	350 Bay St., Toronto.....	Walpole.
Glenny, D.....	Dunnville.....	Canboro.
Grand River Gas & Oil Syndicate.....	Canfield.....	North Cayuga.
Grand River Natural Gas Co., Ltd.....	Welland.....	Moulton.
Grimsby Natural Gas Co., Ltd.....	Grimsby.....	Caistor.
Haldimand Gas Syndicate.....	Cayuga.....	Rainham.
Haldimand Natural Gas Syndicate.....	Stevensville.....	Bertie.
Highbank Oil, Ltd.....	215 King St. W., Chatham.....	Raleigh.
Hill, A. W.....	Coatsworth.....	E. Tilbury.
Hope Gas Syndicate.....	43 Ontario St., St. Catharines.....	Moulton.
House & Harris.....	Stevensville.....	Bertie.
Ideal Gas Syndicate.....	Fisherville.....	Rainham.
Industrial Natural Gas Co.....	Port Robinson.....	Bertie, Crowland, Humberstone and Willoughby.
Jasperson, Bon.....	Kingsville.....	S. Gosfield, Maidstone, Romney and Tilbury E.
Kelly Gas & Oil Syndicate.....	357 Bay St., Toronto.....	Rainham.
Kerwin & Dawson.....	Merlin.....	East Tilbury.
Kindy, D. & Son.....	Selkirk.....	Rainham.
†Leamington, Town of.....	Leamington.....	—
†Lewis & Co.....	Buffalo, N.Y., U.S.A.....	Wainfleet.
Lincoln Gas Co., Ltd.....	372 Bay St., Toronto.....	Caistor, Canboro, Gainsboro and Moulton.
Lindsay and McDougall.....	Canada Permanent Bldg., Edmonton, Alta.....	Canboro, Rainham and Walpole.
Lymburner & Webber.....	Dunnville.....	Moulton and Rainham.
†Lynn Valley Natural Gas Syndicate.....	57 Queen St. W., Toronto.....	Oneida.
McKechnie & Hussey.....	Dunnville.....	Canboro.
McKinney, J. F.....	Niagara Falls, N.Y., U.S.A.....	Rainham.
†Manufacturers Natural Gas Co.....	518 Jackson Bldg., Buffalo, N.Y., U.S.A.....	—
Melrose Oil & Gas Co.....	911 Kent Bldg., Toronto.....	Oneida.
Midfield Gas Co., Ltd.....	144 Main St. E., Hamilton.....	North Cayuga and Oneida.
Midwal Oil & Gas Co.....	5 Elmer Ave., Toronto.....	Middleton and North Walsingham.
Mohawk Gas & Oil Syndicate.....	421 Main St. E., Hamilton.....	Canboro.
Nelles Corners Gas Syndicate.....	Nelles Corners.....	North Cayuga and Rainham.
Niagara Natural Gas Co., Ltd.....	Buffalo, N.Y., U.S.A.....	Moulton.
Niece, H. & Son.....	Lowbanks.....	Sherbrooke.
North Cayuga Natural Gas Syndicate.....	1647 Beacon St., Brookline, Mass., U.S.A.....	North Cayuga.
Northern Gas & Gasoline Co.....	Hepworth.....	Amabel.
North Shore Gas Co.....	Selkirk.....	Rainham.
†Oil Springs Oil & Gas Co., Ltd.....	Oil Springs.....	—

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—(Continued)

Name	Head office address	Location Field
ONTARIO—Concluded		
Olga Gas & Oil Co., Ltd.	320 Bay St., Toronto	Raleigh.
†Ontario Salt Co.	10 West Ave. N., Toronto	—
Otterville Natural Gas Syndicate	176 Dowling Ave., Toronto	Rainham and Walpole.
Patterson, W. C.	Jamestown, N.Y., U.S.A.	Dunn, Seneca, Walpole and Willoughby.
Petrol Oil & Gas Co., Ltd.	204 York Bldg., Toronto	Dover, Oneida, Onondaga and Tuscarora.
†Pope-Ryan Gas Co.	244 Bay St., Toronto	Oneida.
Port Colborne-Welland Natural Gas & Oil Co.	Port Colborne	Oneida, Onondaga and Seneca.
†Prairie Gas & Oil Co., Ltd.	350 Bay St., Toronto	Dover.
Premier Oils, Ltd.	539a St. Clair Ave. W., Toronto	Onondaga.
Provincial Natural Gas & Fuel Co. of Ont., Ltd.	Fort Erie North	Bertie, Crowland, Humberstone and Willoughby.
Rainham Gas Syndicate	Cayuga.	Rainham and Seneca.
Regal Gas Syndicate	244 Bay St., Toronto	Rainham and Walsingham S.
Rich Gas Co.	18 Lola Road, Toronto	Moulton.
Riley, J. V.	Simcoe	Moulton.
Rolston Estate	Dunnville	Canboro.
Romney Gas & Oil Co.	314 Dundas St., London	Romney and Tilbury E.
Salina Gas Co., Ltd.	47 Sixth St., Chatham	Tilbury E.
Sarnia Gas & Oil Co.	Sarnia	Enniskillen and Sarnia.
Selected Natural Gas & Oil Syndicate	40 Garnock Ave., Toronto	Canboro, Moulton and Oneida.
Sherk, John M.	Stevensville	Bertie.
Shepherd, E.	Dunnville	Canboro.
Sherbrooke Gas Syndicate	Dunnville	Sherbrooke.
Smith, R. H.	Lowbanks	Moulton.
Southern Ontario Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	Mersea, Mosa, Raleigh, Romney and East Tilbury.
Springvale Gas & Oil Syndicate	Hagersville	Walpole.
Standard Gas & Oil Syndicate	Fisherville	Rainham and Walpole.
Sterling Gas Co., Ltd.	319 Bay St., Toronto	Walpole.
Stevensville Natural Gas & Fuel Co.	Stevensville	Bertie.
Superior Gas Syndicate	Fisherville	Rainham.
Sweets Corners Gas & Oil Syndicate	Fisherville	Rainham.
Tillsonburg Oil & Gas Co., Ltd.	24 Carlton St., Toronto	Middleton.
Union Gas Co. of Canada, Ltd.	52 Fifth Ave., Chatham	Canboro, North Cayuga, South Cayuga, Dawn, Dover, Dunn, Ekfrid, Euphemia, Haldimand, Rainham, Raleigh, Romney, Seneca, East Tilbury.
†United Gas & Fuel Co. of Hamilton, Ltd.		
Vacuum Gas & Oil Co., Ltd.	Hamilton	Middleton and Orford.
Walpole Gas Syndicate	350 Bay St., Toronto	Walpole.
Walter Gas Syndicate	Cayuga.	Canboro and Middleton.
Welland County Gas Syndicate	Orchard Park, N.Y., U.S.A.	Bertie.
White Oil & Gas Co., Ltd.	Stevensville	Seneca and Walpole.
Imperial Bldg., Sarnia	Imperial Bldg., Sarnia	—
SASKATCHEWAN—		
Lloydminster Gas Co., Ltd.	Lloydminster	Lloydminster.
*Twin Provinces Oil Co., Ltd.	Maple Creek	Near Maple Creek.
ALBERTA—		
Advance Oil Co., Ltd.	Albertan Bldg., Calgary	Turner Valley.
Alberta Clay Products Co., Ltd.	Medicine Hat	Medicine Hat.
Alberta Pacific Consolidated Oils, Ltd.	Toronto General Trusts Bldg., Calgary	Turner Valley.
Albertan Federated Oils, Ltd.	Leeson-Lineham Block, Calgary	Turner Valley.
Associated Oil & Gas Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Baltac Oils, Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
†Bow Island, Town of	Bow Island	—
British Dominion Oil & Development Corp., Ltd.	208 Dominion Bank Bldg., Calgary	Turner Valley.
Calmont Oils, Ltd.	301 Toronto General Trusts Bldg., Calgary	Turner Valley.
Canadian Pacific Railway Co.	Medicine Hat	Medicine Hat.
Canadian Western Natural Gas, Light, Heat & Power Co., Ltd.	215—6th Ave. W., Calgary	Brooks.
Canadian Western Power & Fuel Co., Ltd.	Redcliff	Redcliff.
Commonwealth Petroleum, Ltd.	410 Lancaster Bldg., Calgary	Turner Valley.
Dalhousie Oil Co., Ltd.	606—2nd St. W., Calgary	Turner Valley.
Dominion Glass Co., Ltd.	1111 Beaver Hall Hill, Montreal, P.Q.	Redcliff.
East Crest Oil Co., Ltd.	409 Maclean Block, Calgary	Turner Valley.
Echlin, C. R.	Craigmyle	Craigmyle.
Foothills Oil & Gas Co., Ltd.	606—2nd St. W., Calgary	Turner Valley.
Freehold Oil Corp., Ltd.	Black Diamond	Turner Valley.
Gunderson Brick & Coal Co., Ltd.	Redcliff	Redcliff.
Home Oil Co., Ltd.	508 Pacific Bldg., Vancouver, B.C.	Turner Valley.
Homestead Oils, Ltd.	303 Beveridge Bldg., Calgary	Turner Valley.
Hudson's Bay Oil & Gas Co., Ltd.	522 Lougheed Bldg., Calgary	Viking.
Hyla Oils, Ltd.	118 Renfrew Bldg., Calgary	Turner Valley.
Lowery Petroleum, Ltd.	88 King St. E., Toronto	Turner Valley.
Maple Leaf Milling Co., Ltd.	Medicine Hat	Medicine Hat.
Maple Leaf Oil Co., Ltd.	1007 Stock Exchange Bldg., Vancouver, B.C.	Fabyan.
Mayland Oil Co., Ltd.	606—2nd St. W., Calgary	Turner Valley.
McLeod Oil Co., Ltd.	203 Grain Exchange Bldg., Calgary	Turner Valley.
Medicine Hat, City of	Medicine Hat	Medicine Hat.

DIRECTORY OF FIRMS—Continued
Natural Gas Industry—Concluded

Name	Head office address	Location Field
ALBERTA—Concluded		
Mercury Oils, Ltd.	300 Lancaster Bldg., Calgary	Turner Valley.
Merland Oil Co. of Canada, Ltd.	327-13th St. N.W., Calgary	Turner Valley.
Midfield Oil Co., Ltd.	Turner Valley	Turner Valley.
Miracle Oils, Ltd.	300 Lancaster Bldg., Calgary	Turner Valley.
Model Oils, Ltd.	8 Cameron Block, Calgary	Turner Valley.
New McDougall-Segur Oil Co., Ltd.	70 Union Bldg., Calgary	Turner Valley.
Northwestern Utilities, Ltd.	10124-104th St., Edmonton	Viking.
Ogilvie Flour Mills Co., Ltd.	Medicine Hat.	Medicine Hat.
Okalta Oils, Ltd.	Renfrew Bldg., Calgary	Turner Valley.
Range Oil & Gas Co., Ltd.	101 Canadian Bank of Commerce Bldg., Calgary	Border.
Royalite Oil Co., Ltd.	606-2nd St. W., Calgary	Turner Valley.
Southern Lowery Oils, Ltd.	606-2nd St. W., Calgary	Turner Valley.
Southwest Petroleum Co.	606-2nd St. W., Calgary	Turner Valley.
Spooner Oils, Ltd.	1202-1st St. W., Calgary	Turner Valley.
Sterling Pacific Oil Co., Ltd.	640 Pender St. W., Vancouver, B.C.	Turner Valley.
Sterling Royalties, Ltd.	123-8th Ave. W., Calgary	Turner Valley.
Suffield, Village of	Suffield.	Suffield.
United Natural Gas Development Co., Ltd.	200-203 Leeson-Linchem Block, Calgary	Foremost.
Vainalta Oils, Ltd.	Granville Island, Vancouver, B.C.	Red Coulee.
Wainwright Gas Co., Ltd.	36 Dominion Bank Bldg., Edmonton	
Wellington Oil & Gas Co., Ltd.	4 Central Bldg., Calgary	Turner Valley.
Wetaskiwin, City of	Wetaskiwin.	Wetaskiwin.

NOTE.—*Drilling only. †Distributing only. ‡Producing wells drilled in 1933—no output reported.

Peat Industry

QUEBEC—		
The Hydropeat Co., Ltd.	Box 46, St. Hyacinthe.	St. Hyacinthe.
ONTARIO—		
Stewart Bros.	Chesterville.	Chesterville.

Petroleum Industry

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton.	Stony Creek.
ONTARIO*		
Anderson Bros. & Thompson.	Oil Springs.	Oil Springs.
Anderson, J. H.	Oil Springs.	Oil Springs.
Armstrong, J. E., Estate of.	Petrolia.	Petrolia and Enniskillen.
Brock, Thos.	Petrolia.	Petrolia and Enniskillen.
Bryson, G. C.	Petrolia.	Petrolia and Enniskillen.
Byers, Mrs. Lydia.	Oil Springs.	Oil Springs.
Canadian Oil Refineries, Ltd.	Toronto.	Petrolia and Enniskillen.
Carlton, W. G.	Petrolia.	Petrolia and Enniskillen.
Case, Earl.	Oil Springs.	Oil Springs.
Cole, W. J.	Petrolia.	Petrolia and Enniskillen.
Collins, Matthew.	Petrolia.	Petrolia and Enniskillen.
Crocker-Parks Oil Co., Ltd., The.	Oil Springs.	Oil Springs.
Dennis, Chas.	Oil Springs.	Oil Springs.
Dennis, W.	Oil Springs.	Oil Springs.
Donald, George.	Oil Springs.	Oil Springs.
Dominion Petroleum Co., Ltd., The.	Glencoe.	Mosa.
Edward, F. H.	Petrolia.	Petrolia and Enniskillen.
Fairbank, J. H., Estate of.	Petrolia.	Oil Springs.
Forsythe, Alex.	Petrolia.	Petrolia and Enniskillen.
Gillespie, W. O.	Petrolia.	Petrolia and Enniskillen.
Hamlin, F. G.	Petrolia.	Petrolia and Enniskillen.
Hillis Bros.	Oil Springs.	Oil Springs.
Holmes, E. B.	Bothwell.	Bothwell.
Houston, Mrs. Annie.	Petrolia.	Petrolia and Enniskillen.
Howlett, Fred. W., & Sons, Ltd.	Petrolia.	Petrolia and Enniskillen.
Kelly, J. E.	Petrolia.	Petrolia and Enniskillen.
Kerr, John, Estate of.	Petrolia.	Petrolia and Enniskillen.
Lather, Arthur.	Bothwell.	Bothwell.
Levine, Harry.	Petrolia.	Petrolia and Enniskillen.
Lewis Bros.	Oil Springs.	Oil Springs.
McCall, Ed.	Petrolia.	Petrolia and Enniskillen.
McGrie, R. D.	Bothwell.	Bothwell.
McGill, J.	Petrolia.	Bothwell.
McGillivray, G. A.	Oil Springs.	Oil Springs.
Mitchell, Chas.	Oil Springs.	Oil Springs.
Mitchell, Robert.	Oil Springs.	Oil Springs.
Mornington, H. M.	Oil Springs.	Oil Springs.
Mornington, L. H.	Oil Springs.	Oil Springs.
Nisbet and Miller.	Petrolia.	Petrolia and Enniskillen.
Ontario Lands & Oil Co., Ltd., The.	Petrolia.	Petrolia and Enniskillen.
Osborne Oil Producers.	Petrolia.	Moore.
Parks, Mrs. E. M.	Petrolia.	Petrolia and Enniskillen.
Petrol Oil and Gas Co., Ltd.	204 York Bldg., Toronto.	Dover.
Premier Oils, Ltd.	Petrolia.	Onondaga.
Sutherland, B. M.	Petrolia.	Oil Springs.
Union Gas Co. of Canada, Ltd.	52 Fifth St., Chatham.	Euphemias and Dawn.
Warwick, J.	Oil Springs.	Oil Springs.
Winnett, J. W. G.	4181 Talbot St., London.	Bothwell.
Woodward, Wm.	Oil Springs.	Oil Springs.
Yerks, Carlton S.	Petrolia.	Petrolia and Enniskillen.
Yerks, Frank.	Petrolia.	Petrolia and Enniskillen.

DIRECTORY OF FIRMS—Continued

Petroleum Industry—Concluded

Name	Head office address	Location
ALBERTA—		
Advance Oil Co., Ltd.	Albertan Bldg., Calgary	Turner Valley.
Alberta Pacific Consolidated Oils, Ltd.	Toronto General Trusts Bldg., Calgary	Turner Valley.
Albertan Federated Oils, Ltd.	c/o Security Trust Co., Ltd., Calgary	Turner Valley.
Anaconda Oil Co., Ltd.	218 Traders Bldg., Calgary	Turner Valley.
Associated Oil & Gas Co., Ltd.	c/o Security Trust Co., Ltd., Calgary	Turner Valley.
Baltac Oils, Limited.	c/o Security Trust Co., Ltd., Calgary	Turner Valley.
Bethwain Oils, Ltd.	73 Adelaide St. W., Toronto, Ont.	Wainwright.
British Dominion Oil & Development Corp., Ltd.	208 Dominion Bank Bldg., Calgary	Turner Valley.
Calmont Oils, Limited.	301 General Trusts Bldg., Calgary	Turner Valley.
Commonwealth Petroleum, Limited.	410 Lancaster Bldg., Calgary	Turner Valley and Milk River.†
Dalhousie Oil Co., Ltd.	606-2nd St. W., Calgary	Turner Valley.
Dome Oils, Limited.	c/o Security Trust Co., Ltd., Calgary	Turner Valley.
East Crest Oil Co., Ltd.	409 MacLean Block, Calgary	Turner Valley.
Edalta Oils, Limited.	Provost.	Wainwright.
Foothills Oil & Gas Co., Ltd.	606-2nd St. W., Calgary	Turner Valley.
Freehold Oil Corp., Ltd.	Black Diamond.	Turner Valley.
†Frontier Developments, Ltd.	Bank of Commerce Bldg., Edmonton.	Two Hills (Brosseau).
Hargal Oils, Limited.	1007 Stock Exchange Bldg., Vancouver, B.C.	Turner Valley, Wainwright.
Home Oil Company.	535 Georgia St. W., Vancouver, B.C.	Turner Valley.
Homestead Oils, Limited.	303 Beveridge Bldg., Calgary	Turner Valley.
Hudson's Bay Oil and Gas Co., Ltd.	522 Lougheed Bldg., Calgary	Keho.
Hyla Oils, Limited.	118 Renfrew Bldg., Calgary	Turner Valley.
Lowery Petroleum, Limited.	88 King St. E., Toronto, Ont.	Turner Valley.
McLeod Oil Co., Ltd.	203 Grain Exchange Bldg., Calgary	Turner Valley.
Mayland Oil Co., Limited.	606-2nd St. W., Calgary	Turner Valley.
Mercury Oils, Limited.	300 Lancaster Bldg., Calgary	Turner Valley.
Merland Oil Co. of Canada, Limited.	227 Examiner Bldg., Calgary	Turner Valley.
Midfield Oil Co., Ltd.	Turner Valley.	Turner Valley.
Miracle Oils, Limited.	300 Lancaster Bldg., Calgary	Turner Valley.
Model Oils, Limited.	8 Cameron Block, Calgary	Turner Valley.
The New McDougall Segur Oil Co., Ltd.	70 Union Bldg., Calgary	Turner Valley.
Okalta Oils, Limited.	Renfrew Bldg., Calgary	Turner Valley.
Paramount Oils, Ltd.	407 Grain Exchange Bldg., Calgary	Rickert.
Parco Oil Co., Ltd.	25 Canada Life Bldg., Calgary	Twin River.
Richfield Petroleum, Limited.	224 Examiner Bldg., Calgary	Turner Valley.
Royalite Oil Co., Limited.	606-2nd St. W., Calgary	Turner Valley.
Sasko-Wainwright Oil & Gas Co., Ltd.	Wainwright.	Wainwright.
Southern Alberta Exploration Co., Ltd.	290 Garry St., Winnipeg, Man.	Red Coulee.
Southern Lowery Oils, Limited.	606-2nd St. W., Calgary	Turner Valley.
Southwest Petroleum Company.	606-2nd St. W., Calgary	Turner Valley.
Spooner Oils, Limited.	1202-1st St. W., Calgary	Turner Valley.
Sterling Pacific Oil Co., Ltd.	640 Pender St., Vancouver, B.C.	Turner Valley.
Sterling Royalties, Ltd.	123-8th Ave. W., Calgary	Turner Valley.
United Oils, Limited.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Vanalta Oils, Limited.	Granville Island, Vancouver, B.C.	Red Coulee.
Vulcan Oils, Limited.	Vulcan.	Turner Valley.
Wayne Oils, Limited.	Wayne.	Turner Valley.
Wellington Oil & Gas Co., Ltd.	4 Central Bldg., Calgary	Turner Valley.
Widney Oils, Limited.	231-8th Ave. W., Calgary	Turner Valley.
NORTH WEST TERRITORIES—		
Northwest Co., Limited.	56 Church St., Toronto, Ont.	Fort Norman.

*Producers of 500 barrels or more during the year.

†Drilling only.

OTHER NON-METAL MINING INDUSTRIES

Actinolite Mining Industry

Name	Head office address	Location
ONTARIO— Levens, W.*	618 Bloor St. W., Toronto	Addington Co.

*Not producing.

Asbestos Mining Industry

Asbestos Corporation Ltd.	Canada Cement Bldg., Montreal, P.Q.	Thetford Mines, P.Q. East Broughton, P.Q. Black Lake, P.Q. Coleraine, P.Q. Asbestos, P.Q.
Canadian Johns-Manville Co. Ltd.	Montreal, P.Q.	Thetford Mines, P.Q.
Johnson's Company	Thetford Mines West, P.Q.	Black Lake, P.Q. Thetford Mines, P.Q.
Keasbey & Mattison Co.	Ambler, Pa., U.S.A.	
Nicolet Asbestos Mines Ltd.	c/o Greenshields & reenshields, Transportation Bldg., Montreal, P.Q.	Tingwick Tp., P.Q. Wolfe Co., P.Q.
Northern Asbestos Co. Ltd.	Thetford Mines, P.Q.	Thetford Mines, P.Q.
Quebec Asbestos Corp. Ltd.	East Broughton Station, P.Q.	East Broughton, P.Q.

Barytes

NOVA SCOTIA— Brandram-Henderson, Ltd.	Montreal, P.Q.	East Lake Ainslie, Inverness Co.
--	----------------	----------------------------------

*Not producing.

Bituminous Sands

ALBERTA— International Bitumens Ltd.	411 Williamson Bldg., Edmonton	Fort McMurray District.
McMurray Asphaltum and Oil, Ltd.	Petrolia, Ont.	Fort McMurray District.

Diatomite

NOVA SCOTIA— International Diatomite Industries, Ltd.	60 E. 42nd Street, New York City, U.S.A.	Little River. East New Annap.
ONTARIO— Diatomite Products Ltd.	Room 215, 159 Bay St., Toronto	Martin Siding, Muskoka.
Dominion Diatomite Ltd.	642 King St. W., Toronto	Novar.
BRITISH COLUMBIA— B.C. Refractories Ltd.	660 Taylor St., Vancouver	Quesnel.

Feldspar and Quartz Mining Industry

NOVA SCOTIA— (a) Dominion Steel & Coal Corp. Ltd.	Sydney	Leitches Creek.
(b) River Denys Sand and Clay Co. Ltd.	Box 57, Port Hood	Melford.
QUEBEC— (x) Canadian Flint & Spar Co. Ltd.	Box 340, Buckingham	Buckingham.
(a) Bigelow, Robt.	Buckingham	Hull Co.
(a) Bourne, W.	Poupore	Buckingham Dist.
(a) (x) Canadian Carborundum Co. Ltd.	Box 65, Niagara Falls, Ont.	St. Canut.
(a) (x) Canadian Kaolin Silica Products, Ltd.	660 St. Catherine St. W., Montreal	St. Remi d'Amherst.
(a) Chalifoux, J. S.	Notre Dame de la Salette	N.D. de la Salette.
(a) Couture, E.	Glen Almond	Glen Almond.
Derry Mining Co.	Buckingham	Derry Tp.
Evans, W. H.	Buckingham	Buckingham Tp.
Lonsdale, S.	Poupore	Poupore.
(a) Mason, Jas. H.	1451 King St. W., Toronto, Ont.	Guigues.
(a) McClements, Albert	Buckingham	Papineau Co.
(a) McDonald, Ed.	Buckingham	Buckingham Dist.
McDonnell, Jas.	Box 92, Buckingham	Derry Tp.
O'Brien & Fowler, Ltd.	Victoria Bldg., Ottawa, Ont.	Buckingham Dist.
(a) (x) Ottawa Silica & Sandstone, Ltd.	East Templeton	Templeton Tp.
Parcher, Alfred	Glen Almond	Derry Tp.
(a) Pedneaud, G.	Buckingham	Buckingham Dist.

DIRECTORY OF FIRMS—Continued

Feldspar and Quartz Mining Industry—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
St. Amour, O.	Notre Dame de la Salette.	Villeneuve Tp.
(b)(x)Silica Products of Canada, Ltd.	Lac Bouchette.	Lac Bouchette.
(a)Stewart, Wm.	Buckingham.	Buckingham Dist.
(a)Stookes, Allan.	Buckingham.	Buckingham Dist.
Toutloff, Frank.	Gatineau Point.	Portland Tp.
(a)Warwick, W. M.	Glen Almond.	Papineau Co.
(a)Winning, Bush.	Notre Dame de la Salette.	N.D. de la Salette.
ONTARIO—		
Anderson, J. G. & Son.	Lucknow.	Britt.
Bathurst Feldspar Mines Ltd.	230 King St. E., Toronto.	Lanark Co.
Craig, T. H.	Box 302, Perth.	Lanark Co.
(a)(x) Dominion Mines & Quarries.	Canada Life Bldg., Toronto.	Killarney.
(x)Frontenac Floor & Wall Tile Co. Ltd.	Kingston.	Kingston.
MacDonald, P.	Hybla.	Hybla.
MANITOBA—		
(a)Lake Bar Sand & Gravel Co.	Winnipeg Rink, Langside St., Winnipeg.	Black Island.
Winnipeg River Tin Mines Ltd.	102 Hurst Block, Winnipeg.	Lac du Bonnet Dist.

(a) Reported production of silica only.

(b) Idle in 1933.

(x) Operated mills.

NOTE—In addition to these operators, metallurgical plants in Ontario, Manitoba and British Columbia produced silica flux for their own use.

Fluorspar

ONTARIO—		
Storlosar, Chas. A.	Madoc, Ont.	Hastings Co.
Wallbridge Estate.	Box 141, Madoc.	Hastings Co.

Garnets

QUEBEC—		
Labelle Nickel & Garnet Co. Ltd.	354 St. Catherine St. E., Montreal.	Labelle County.

Graphite

QUEBEC—		
Canadian Graphite Corporation.	1193 Phillips Place, Montreal.	Boyer Tp.
ONTARIO—		
Black Donald Graphite Co. Ltd.	Calabogie.	Brougham Tp.

Grindstones, Pulpstones and Sharpening Stones

NOVA SCOTIA—		
The Read Stone Co.	Sackville, N.B.	Quarry Island.
NEW BRUNSWICK—		
The Read Stone Co.	Sackville.	Stonehaven.
Smith, E. A.	Shediac.	Shediac.
BRITISH COLUMBIA—		
McDonald, J. A. and C. H., & Co.	1271 Main Street, Vancouver.	Newcastle Island.

Gypsum Mining Industry

NOVA SCOTIA—		
Atlantic Gypsum Products Company.	40 Central St., Boston, Mass., U.S.A.	Aspy Bay, Cheticamp and Walton.
Canadian Gypsum Co. Ltd.	1221 Bay St., Toronto, Ont.	Wentworth.
The Connecticut Adamant Plaster Co.	10 River St., New Haven, Conn., U.S.A.	Cheverie.
The Nova Scotia Coal & Gypsum Co. Ltd.	Box 13, Mabou.	Mabou Harbour.
North American Gypsum Co. Inc.	96 Curtis Ave., Rutland, Vt., U.S.A.	Baddeck Bay.
Windsor Gypsum Co.	Box 727, Newburgh, N.Y., U.S.A.	Newport Station.
Windsor Plaster Co. Ltd.	Windsor.	Brooklyn, Hants Co.
NEW BRUNSWICK—		
Canadian Gypsum Co. Ltd.	1221 Bay St., Toronto, Ont.	Hillsborough.
Thompson, F. M.	Hillsborough.	Hillgrove.

DIRECTORY OF FIRMS—Continued

Gypsum Mining Industry—Concluded

Name	Head office address	Location
ONTARIO— Canadian Gypsum Co. Ltd..... Gypsum, Lime and Alabastine, Canada, Ltd.	1221 Bay St., Toronto..... Paris.....	Hagersville. Caledonia.
MANITOBA— Gypsum, Lime and Alabastine, Canada, Ltd. Western Gypsum Products Ltd.....	Paris, Ont..... 503 McArthur Bldg., Winnipeg.....	Gypsumville. Amaranth.
BRITISH COLUMBIA— Gypsum, Lime and Alabastine, Canada, Ltd.	Paris, Ont.....	Falkland.

Iron Oxides Mining Industry

QUEBEC— Argall, Thos. H..... Montmorency Paint Products Co. Ltd..... The Sherwin-Williams Co. of Canada, Ltd.....	639 St. Angel, Three Rivers..... 6684 St. Urbain St., Montreal..... 2875 Centre St., Montreal.....	La Point du Lac. Les Forges. Red Mill.
BRITISH COLUMBIA— Davidson, J. G., and Thompson, J. H.....	3498 Marine Drive, Vancouver.....	Rainbow Lodge.

Magnesitic Dolomite

QUEBEC— Canadian Refractories Ltd..... International Magnesite Co. Ltd.....	1050 Canada Cement Bldg., Montreal..... Calumet.....	Grenville Tp. Harrington Tp.
BRITISH COLUMBIA— Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Marysville.

Magnesium Sulphate

BRITISH COLUMBIA— Collander, H. B.....	390 Church St., Winnipeg, Man.....	Kamloops.
---	------------------------------------	-----------

Mica Mining Industry

QUEBEC— Blackburn Bros..... Brown Bros..... Cross, W. C..... Flynn, Bernard J..... Laurel Mining Co. Ltd..... Martin, A. G..... North Shore Mining Co..... Paradis, Pierre.....	Blackburn Bldg., Ottawa, Ont..... Cantley..... Cascades..... 33 Montcalm St., Hull..... Ameau Bldg., Three Rivers..... 236 Besserer St., Ottawa, Ont..... c/o A. Chartier, 10 Franklin St., Quebec, P.Q. Laurel.....	Templeton Tp. Cantley. Hull Dist. Cameron Tp. Argenteuil Co. Hull and Wakefield Tps. Bergeronnes Tp. Argenteuil Co.
ONTARIO— Anderson, J. G. and Son..... Chenier, Z. E..... Kent Bros..... Lee, W. W..... Loughborough Mining Co. Ltd..... Martin, A. G.....	Lucknow..... Rockland..... Gore St., Kingston..... Bedford Mills..... Sydenham..... 236 Besserer St., Ottawa.....	Bancroft area. Kingston. Bob's Lake. Sydenham. Ottawa.
BRITISH COLUMBIA— B.C. Refractories Ltd.....	660 Taylor St., Vancouver.....	Armstrong.

Mineral Waters (Natural)

QUEBEC— Abenakis Mineral Springs Reg'd..... Coulombia Springs..... Eau Minérale Etoile..... Maski Bottling Works..... Radnor Mineral Water Springs.....	Pierreville..... L'Epiphanie..... Ste. Genevieve de Batiscan..... Maskinonge..... St. Maurice.....	Yamaska Co. L'Epiphanie. Rivière Batiscan. Maskinonge. Fermont.
ONTARIO— Boyd, T. R..... Deneault, F..... Gurd, Chas., & Co. Ltd.....	Carlsbad Springs..... Bourget..... 1016 Bleury St., Montreal, P.Q.....	Gloucester Tp. Bourget. Caledonia Tp.

DIRECTORY OF FIRMS—Continued

Phosphate

Name	Head office address	Location
QUEBEC— McGlashen, R. J..... St. Amour, A.....	190 Montcalm St., Hull..... Notre Dame de la Salette.....	Wilson's Corners. Papineau Co.
BRITISH COLUMBIA— The Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail, B.C.....	Crowsnest. Fernie.

Pyrites (Sulphur)

QUEBEC— Aldermac Mines Ltd.(x)..... Consolidated Copper & Sulphur Co. Ltd.(x).....	941 Dominion Square Bldg., Montreal..... Eustis.....	Boischatel Tp. Ascot Tp.
ONTARIO— International Nickel Co. of Canada, Ltd.(a).....	Copper Cliff.....	Copper Cliff.
BRITISH COLUMBIA— Consolidated Mining & Smelting Co. of Canada, Ltd.(a)..... Britannia Mining & Smelting Co. Ltd.(x).....	Trail..... Britannia Beach.....	Trail. Britannia Beach.

(x)Pyrites. (a)Salvaged smelter gas.

Salt Industry

NOVA SCOTIA— Malagash Salt Co. Ltd.....	Box 264, New Glasgow.....	Malagash.
ONTARIO— Brunner, Mond Canada, Ltd..... Canadian Industries Limited..... Dominion Salt Co. Ltd..... Goderich Salt Co. Ltd..... Warwick Pure Salt Co. Ltd..... Western Canada Flour Mills Co. Ltd.....	501 Dominion Bank Bldg., Toronto..... P.O. Box 1260, Montreal, P.Q..... Sarnia..... Goderich..... R.R. 5, Watford..... 287 MacPherson Ave., Toronto.....	Amherstburg. Sandwich. Sarnia. Goderich. Warwick Tp. Goderich.
MANITOBA— Neepawa Salt Co. Ltd.....	Neepawa.....	Neepawa.
SASKATCHEWAN— Simpson Oil Co. Ltd.....	Simpson.....	Simpson.
ALBERTA— (x)Triple A Salt Co. Ltd.....	c-o A. Von Hammerstein, Rosslyn Court, Edmonton.....	Saline Lake.

(x)No production reported.

Silica Brick

NOVA SCOTIA— Dominion Steel & Coal Corp. Ltd.....	Sydney.....	Sydney.
ONTARIO— Algoma Steel Corp. Ltd.....	Sault Ste. Marie.....	Sault Ste. Marie.

Sodium Carbonate

BRITISH COLUMBIA— B.C. Sodium Syndicate..... Bishop, James A..... Soda Mining & Products Co. Ltd.....	Kamloops..... Clinton..... 423 Hamilton St., Vancouver.....	Cherry Creek. Kamloops M.D. Kamloops M.D.
--	---	---

Sodium Sulphate

SASKATCHEWAN— Dominion Sodium Refineries Ltd..... Gallagher, C. A., & Son..... Horseshoe Lake Mining Co. Ltd..... Martin's Medical Salt Works..... Natural Sodium Products, Ltd..... Saskasul Ltd..... Sodium Corp. Ltd.....	513 Lougheed Bldg., Calgary, Alta..... Watrous..... Ormiston..... Watrous..... 409 Walter Scott Bldg., Moose Jaw..... Westman Chambers, Regina..... 302 Bay St., Toronto, Ont.....	Fusilier. Manitou Beach. Ormiston. Watrous. Frederick Lake. Sask. Alsask.
---	--	---

DIRECTORY OF FIRMS—Continued

Talc and Soapstone Industry

Name	Head office address	Location
QUEBEC— Broughton Soapstone and Quarry Co. Ltd....	Broughton Station.....	Beauce Co.
ONTARIO— Canada Talc Ltd..... Gillespie, Geo. H..... Henderson Mines Ltd.....	Madoc..... Madoc..... Madoc.....	Hastings Co. Madoc. Hastings Co.
BRITISH COLUMBIA— B.C. Refractories Ltd..... Kennedy, J. J.....	660 Taylor St., Vancouver..... Sooke Lake.....	Anderson Lake. Sooke Lake.

Volcanic Dust

SASKATCHEWAN— Canada Permanent Trust Co.....	Regina.....	Swift Current.
---	-------------	----------------

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

CLAY PRODUCTS INDUSTRY

Brick, Tile, Clay and Sewer Pipe

Name	Head office address	Location
NOVA SCOTIA—		
Brooks, Stephen & Sons.....	Box 359, New Glasgow.....	New Glasgow.
Miller, Jas. B.....	Elmsdale, Hants Co.....	Barney Brook.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax.....	Elmsdale.
Standard Clay Products Ltd.....	St. Johns, P.Q.....	New Glasgow.
NEW BRUNSWICK—		
Little River Brick Co. Ltd.....	Little River.....	Little River.
Ryan, M., & Son, Ltd.....	Fredericton.....	Fredericton.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax, N.S.....	Chipman.
QUEBEC—		
Ascot Tile & Brick Co. Ltd.....	Ascot Corner.....	Richmond Co.
Begin, Olivier.....	Petite Rivière, R.R. 1.....	Petite Rivière.
Brunelle, L. H.....	Victoriaville.....	Ste. Victoire.
Chicoutimi Brick Ltd.....	Chicoutimi.....	Chicoutimi.
Citadel Brick Ltd.....	14 St. Joseph St., Quebec.....	L'Islet Station, Boischatel and Lauzon.
Duquette & Lacroix.....	East Angus.....	Westbury.
Frontenac Brick Ltd.....	140 St. John St., Quebec.....	Beaufort Est.
Granby Brick Co.....	Granby.....	Granby.
Hodgins, David T.....	Shawville.....	Clarendon Tp.
Laprairie Co. Inc.....	320 Canada Cement Bldg., Montreal.....	Laprairie and Delson.
Lotbinière Brick Works Ltd.....	Deschailions.....	Deschailions.
Montreal Terra Cotta Co. Ltd.....	Dominion Square Bldg., Montreal.....	Lakeside.
Panet Brick Co. Ltd.....	L'Islet.....	L'Islet Station.
Potvin, Alphonse.....	Deschailions.....	Deschailions.
Scott Brick Inc.....	8 St. Joseph St., Quebec.....	Dorchester Co.
Standard Clay Products Ltd.....	Box 819, St. Johns.....	St. Johns.
St. Lawrence Brick Co. Ltd.....	1010 St. Catherine St. W., Montreal.....	Laprairie.
St. Tite Industrial Ltd.....	St. Tite.....	St. Tite.
ONTARIO—		
Barnhardt, W. H.....	Stratford.....	Stratford.
Booth Brick & Lumber Co.....	New Toronto.....	York Co.
Brampton Pressed Brick Co. Ltd.....	Brampton.....	Chingacousy Tp.
Broadwell, B., & Son.....	Kingsville.....	Essex Co.
Campbell, N. F.....	West Lorne.....	Elgin Co.
Canadian Pressed Brick Co. Ltd.....	195 Ottawa St. S., Hamilton.....	Hamilton.
Casemore, R., & Son.....	Shallow Lake.....	Shallow Lake.
Chapman Bros.....	145 Dawes Rd., Toronto.....	East York Tp.
Chapman, John.....	R. R. 3, Napanee.....	N. Fredericksburg Tp.
Cooksville Co. Ltd.....	132 St. James St. W., Montreal, P.Q.....	Cooksville.
Coultis, George, & Son.....	Thedford.....	Lambton Co.
Crag, Booth Ltd.....	New Toronto.....	N. York.
Curtin, F., Estate.....	R. R. 4, Lindsay.....	Victoria Co.
Curtis Bros.....	Box 809, Peterborough.....	Otonabee and Douro Tps.
Cowell, Geo. W.....	Box 361, Tillsonburg.....	Oxford Co.
Dalton, Mark.....	Dresden.....	Dawn Tp.
Deller, Albert, & Son.....	Brownsville.....	Oxford Co.
Deller Bros.....	R. R. 2, Norwich.....	Oxford Co.
Deller, Wm. H.....	R. R. 4, Thorndale.....	W. Nissouri Co.
Denison Tile Co. Ltd.....	Windsor.....	Fletcher, Tilbury East Tp., Rochester Tp.
Dochart Brick, Tile & Terra Cotta Works.....	Arnprior.....	Arnprior.
Dolan, John & Sons.....	R. R. 2, Watford.....	Lambton Co.
Douglas & Douglas.....	Wilkesport.....	Lambton Co.
Dover Brick & Tile Works.....	Chatham.....	Dover Tp.
Donaldson, Thos. Geo.....	R. R. 1, Greenock.....	Culross Tp.
Elliott, Chas.....	Bluevale.....	Turnbury Tp.
Elliott, James, Jr.....	Sault Ste. Marie.....	Korah Tp.
Elliott, Wm.....	Glenora.....	Bruce Co.
Fort William Brick Co.....	Fort William.....	Fort William.
Frid Bros. Ltd.....	Main W. and Macklin Sts., Hamilton.....	Hamilton.
Grimsby Brick & Tile Ltd.....	Grimsby.....	Grimsby.
Godfrey, Thos., & Co.....	Carleton Place.....	Beckwith Tp.
Gomall Brick and Tile Works.....	Powassan.....	Hinsworth Tp.
Haist, Wellington R.....	Crediton.....	Huron Co.
Halton Brick Co. Ltd.....	Lindsay.....	Halton Co.
Hamilton Pressed Brick Co. Ltd.....	Kensington Ave. S., Hamilton.....	Wentworth Co.
Harper Brick Works.....	348 Greenwood Ave., Toronto.....	York Co.
Hill, Aaron.....	Essex.....	Essex Co.
Hill, A. W.....	Coatsworth.....	Tilbury East.
Hitch, D. A.....	Ridgetown.....	Ridgetown.
Hitch, Thomas.....	Box 254, St. Thomas.....	Elgin Co.
Hodder, Mrs. J. H., & Sons.....	Dutton.....	Dunwich.
Howlett, Fred W., & Sons, Ltd.....	Box 3, Petrolia.....	Petrolia and Brigden.
Huntsville Brick Works.....	Box 308, Huntsville.....	Muskoka.
Interprovincial Brick Co. Ltd.....	132 St. James St. W., Montreal, P.Q.....	Chingacousy Tp. Nassagaweya Tp.

DIRECTORY OF FIRMS—Continued
Brick, Tile, Clay and Sewer Pipe—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Jackson, W. B.	290 Rawdon St., Brantford.	Brantford.
Jamieson Lime Co.	Renfrew.	Renfrew.
James, D. A.	Mt. Brydges.	Middlesex Co.
Jasperson Brick & Tile Co.	Box 586, Kingsville.	Coatsworth.
Jervis, W. J.	Dorchester.	N. Dorchester.
Johnson, James, Estate.	R.R. 3, Pembroke.	Stafford Tp.
Kerr, Chas., & Son.	R.R. 4, Goderich.	Colborne Tp.
Kerr, Fred.	Crediton.	Crediton.
Koebel Bros.	Box 54, St. Clements.	Waterloo Co.
Lindsay, Earl, & Sons.	R.R. 2, Wallaceburg.	Chatham Gore Tp.
McComb, Chester.	R.R. 2, London.	Middlesex Co.
McCormick Bros.	R.R. 5, Watford.	Lambton Co.
McFarlane, W. J.	Forest.	Forest.
McFarren, F. B., Ltd.	18 Toronto St., Toronto.	Streetsville.
McMahon, Robert.	R.R. 2, Kerwood.	Metcalfe Tp.
Milton Brick Ltd.	1158 Bay St., Toronto.	Milton and Streetsville.
Moulton, John.	R.R. 2, Holyrood.	Bruce Co.
National Fire Proofing Co. of Canada, Ltd.	211 Dominion Bank Bldg., Toronto 2.	Aldershot.
National Sewer Pipe Co., Ltd.	Aldershot.	Hamilton, Mimico, Swanses, E. Flamboro tp.
New Liskeard Brick Works.	Box 74, New Liskeard.	New Liskeard.
Ontario Brick & Tile Plant (Government)	Provincial Secretary, Parliament Bldg., Toronto.	Mimico.
O'Reilly, Thos.	320 Bay St., Ottawa.	Prescott Highway.
Ott Brick & Tile Manufacturing Co., Ltd.	Kitchener.	Kitchener.
Ottawa Brick & Terra Cotta Co., Ltd.	Billings Bridge.	Gloucester tp.
Owen Sound Brick Co., Ltd.	Owen Sound.	Owen Sound.
Parks, H. W.	R.R. 2, Dresden.	Camden tp.
Paxton, Fred R.	70 Herrick Ave., St. Catharines.	St. Catharines.
Phim, George A.	St. James Park P.O., London.	Middlesex co.
Phippen, H. W., & Son.	Box 11, Coleman P.O.	East York.
Port Rowan Brick & Tile Co.	Port Rowan.	Port Rowan.
Richardson, J., & Son.	Kerwood.	Kerwood.
Snelgrove, A.	Beaverton.	Ontario co.
Sproat and Sproat.	R.R. 4, Seaforth.	Tuckersmith tp.
Standard Brick Co., Ltd.	500 Greenwood Ave., Toronto.	Toronto.
Stroh, M. C.	Conestogo.	Waterloo co.
Sun Brick & Tile Co., Ltd.	1104 Bay St., Toronto.	Don Valley.
Superior Brick & Tile Co., Ltd.	426 Victoria Ave., Fort William.	Paipoonge.
Thompson, Ralph.	Hengryn.	Huron co.
Tope, Richard, Brick Works.	677 Main St. W., Hamilton.	Hamilton.
Toronto Brick Co., Ltd.	397 Bay St., Toronto.	Milton, Toronto, York tp.
Vernon Brick Works.	Dawes Road, Toronto.	East York.
Wagstaff, Chas.	R.R. 4, Lindsay.	Lindsay.
Wallace, R., & Son.	Toronto General Trust Corp., 253 Bay St., Toronto.	Widdifield tp.
Wein, Aaron.	Crediton.	Huron co.
Weitzel, John E.	R.R. 1, Tavistock.	Oxford co.
Wright, Geo., & Sons.	Comber.	Comber.
MANITOBA—		
Alsip Brick, Tile & Lumber Co., Ltd.	537 Portage Ave., Winnipeg.	Winnipeg.
Marion Brick Co.	Box 30, St. Boniface.	St. Boniface.
Snyder Brick Yards, Ltd.	Portage la Prairie.	Portage la Prairie.
Wardrop, D. M.	Whitemouth.	Whitemouth.
SASKATCHEWAN—		
Bruno Clay Works, Ltd.	405 Birks Bldg., Saskatoon.	Bruno.
Dominion Fire Brick & Clay Products, Ltd.	Moose Jaw.	Claybank.
International Clay Products, Ltd.	Estevan.	Estevan and Prince Albert.
Shand Coal & Brick Co.	Shand.	Shand.
ALBERTA—		
Aerne Brick Co., Ltd.	125 Alberta Block, Edmonton.	Cannell Siding.
Alberta Clay Products Co., Ltd.	Box 672, Medicine Hat.	Medicine Hat.
Gunderson Brick and Coal Co., Ltd.	Redcliff.	Redcliff.
Johansen, K.	Grand Prairie.	Grand Prairie.
Little, J. B., & Sons, Ltd.	Edmonton.	Edmonton.
Medicine Hat Brick & Tile Co., Ltd.	Medicine Hat.	Medicine Hat.
Redcliff Pressed Brick Co., Ltd.	Redcliff.	Redcliff.
Redcliff Premier Brick Co., Ltd.	Redcliff.	Redcliff.
BRITISH COLUMBIA—		
Baker Brick & Tile Co., Ltd.	3191 Douglas St., Victoria.	Victoria.
B.C. Refractories, Ltd.	660 Taylor St., Vancouver.	Williams Lake, Princeton.
C.C. of U.B., Ltd.	Brilliant.	Grand Forks.
Clayburn Co., Ltd.	850 West Hastings St., Vancouver.	Kilgard.
Gabriola Shale Products, Ltd.	1304 Broad St., Victoria.	Gabriola Island.
Gorse, Percy A.	Salmon Arm.	Enderby.
Haug, Wm., and Son.	Box 166, Kelowna.	Kelowna.
Port Haney Brick Co., Ltd.	346 Howe St., Vancouver.	Port Haney.
Prince George Brick Yard.	Prince George.	Prince George.
Vancouver Brick & Tile Co., Ltd.	2521 Maple St., Vancouver.	Sullivan.

DIRECTORY OF FIRMS—Continued

Stoneware and Pottery

Name	Head office address	Location
NEW BRUNSWICK— Foley Pottery, Ltd.....	Sub. P.O. 4, Saint John.....	Saint John.
ONTARIO— Foster Pottery, Co..... London Pottery Mfg. Co.....	Main St. W., Hamilton..... 95 Rectory St., London.....	Hamilton. London.
ALBERTA— Medalta Potteries, Ltd.....	Medicine Hat.....	Medicine Hat.
BRITISH COLUMBIA— Baker Brick & Tile Co., Ltd..... B.C. Clay Products, Co.....	3191 Douglas St., Victoria..... 3439 Euclid Ave., Vancouver.....	Victoria. Vancouver.

OTHER STRUCTURAL MATERIALS

Cement Industry

QUEBEC— Canada Cement Co., Ltd..... National Cement Co., Ltd.....	Box 290, Station B, Montreal..... Box 170, Station Hochelaga, Montreal.....	Hull and Montreal East. Montreal East.
ONTARIO— Canada Cement Co., Ltd..... St. Mary's Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q..... 357 Bay St., Toronto.....	Belleville, Lakefield and Port Colborne. St. Mary's.
MANITOBA— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q.....	Fort White and Steep Rock.
ALBERTA— Canada Cement Co., Ltd..... Marlboro Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q..... Dominion Bank Bldg., Edmonton.....	Exshaw. Marlboro.
BRITISH COLUMBIA— British Columbia Cement Co., Ltd..... Coast Cement Co., Ltd.....	Belmont Bldg., Victoria..... Granville Island, Vancouver.....	Bamberton. Granville Island.

Lime Industry

NOVA SCOTIA— Dominion Steel & Coal Corp., Ltd..... Eastern Lime Co., Ltd.....	Sydney..... Windsor.....	Sydney. Windsor.
NEW BRUNSWICK— Bathurst Power and Paper Co., Ltd..... Purdy & Green, Ltd..... Randolph & Baker, Ltd..... Saint John Lime Co..... Snowflake Lime, Ltd.....	Bathurst..... 323 Main St., Saint John..... Randolph..... Brookville..... 3 Pokiok Road, Saint John.....	Bathurst. Saint John. Randolph. Brookville. Saint John.
QUEBEC— Arnaud & Beaudry..... Boivin, Arthur..... Bouchard, P..... Camarda, J. (St. Martin Lime Co.)..... Canada Lime & Stone, Ltd..... Desfond, Gaspard..... Dominion Lime Co..... Dontigny, Yvon..... Gagne, Octave..... Héon and Héon..... Laurentian Stone Co., Ltd..... Lalumière, Joseph..... Limoges, Henri..... Montreal Lime Co., Ltd..... National Stone & Lime Co., Reg'd..... Shawinigan Chemicals, Ltd..... Standard Lime Co., Ltd..... Stinson-Reeb Builders Supply Co., Ltd.....	Joliette..... Pont Rouge..... Ste. Anne de Chicoutimi..... Cap St. Martin..... St. Marc des Carrières..... St. Cuthbert..... Lime Ridge..... Ste. Thécle..... St. Ulric..... St. Louis de Champlain..... 195 Nicholas St., Ottawa..... St. Dominique de Bagot..... 552 Poupart St., Montreal..... 6655 St. Dennis St., Montreal..... 386 rue Lemoyne, Montreal..... Box 2670, Montreal..... Joliette..... 360 Dorchester St. W., Montreal.....	Joliette. Pont Rouge. Ste. Anne de Chicoutimi. Cap St. Martin. St. Marc des Carrières. St. Cuthbert. Lime Ridge. Lac Travers. St. Ulric. St. Louis de Champlain. Hull. St. Dominique de Bagot. Montreal. St. Marc des Carrières. Shawinigan Falls. St. Paul de Joliette. Montreal.
ONTARIO— American Cyanamid Co..... Bell, Harry..... Biederman, Albert..... Brown's Lime Works..... Brunner, Mond Canada, Limited..... Cameron, W. M.....	30 Rockefeller Plaza, New York City, U.S.A. R.R. 4, Chesley..... R.R. 1, Golden Lake..... 491-9th Ave. E., Owen Sound..... 501 Dominion Bank Bldg., Toronto..... Carleton Place.....	Niagara Falls. Grey county. Golden Lake. Owen Sound. Amherstburg. Carleton Place.

DIRECTORY OF FIRMS—Continued

Lime Industry—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Canada & Dominion Sugar Co., Ltd.	Chatham	Chatham and Wallaceburg.
Canada Lime Co., Ltd.	118 Pembroke St., Toronto	Coboconk.
Canadian Gypsum Co., Ltd.	Windsor, N.S.	Guelph.
Chalmers Lime Works.	Owen Sound.	Owen Sound.
Delta Lime Plant.	Delta.	Delta.
Dominion Rock Products, Ltd.	941 Dominion Square Bldg., Montreal, P.Q.	Eganville.
Gallagher Lime & Stone Co., Ltd.	Upper James St., Hamilton	Wentworth co.
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris.	Beachville, Elora, Glen Christie, Nassagawa tp.
Innerkip Lime & Stone Co., Ltd.	Beachville	Beachville.
Jamieson Lime Co.	Renfrew	Renfrew.
Shane Lime Co.	Eganville.	Eganville.
Toronto Brick Co., Ltd.	897 Bay St., Toronto	Coboconk.
Wepler, Henry	Priceville	Grey co.
MANITOBA—		
Gillis Quarries, Ltd.	Spruce and Richards Sts., Winnipeg	Winnipeg.
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris, Ont.	Winnipeg.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg	Spearhill and Stonewall.
ALBERTA—		
Canadian Sugar Factories, Ltd.	Raymond	Raymond.
Loder's Lime Co., Ltd.	Kananaskis.	Kananaskis.
Summit Lime Works.	Box 273, Lethbridge	S $\frac{1}{2}$ Sec. 7, Tp. 8, R. 5, W5th.
BRITISH COLUMBIA—		
Pacific Mills, Ltd.	Raymur Ave., Vancouver	Ocean Falls.
Pacific Lime Co., Ltd.	744 West Hastings St., Vancouver	Blubber Bay.
Reno Gold Mines, Ltd.	Yorkshire Bldg., Vancouver	Reno Mine.
Rosebank Lime Co.	602 Pacific Bldg., Vancouver	Esquimalt.

Sand and Gravel

NOVA SCOTIA—		
Campbell, M. J.	Boisdale	Boisdale.
McSween, A. H.	Ironville	Ironville.
Nova Scotia Dept. of Highways	Halifax	Various.
NEW BRUNSWICK—		
Fundy Sand and Gravel Co., Ltd.	Box 538, Saint John	Saint John.
Likely, Jos. A., Ltd.	Saint John	East Saint John.
Maxwell, Chas. and Son	R. R. 3, St. Stephen	Charlotte County.
New Brunswick Dept. of Highways	Fredericton	Various.
QUEBEC—		
Baillargeon & Faubert	62 Blvd. Union, St. Lambert	St. Isidore.
Beaulieu, L.	St. André	St. André.
Belanger, Joseph	Ascot Corner	Ascot Corner.
Bennett, Gertrude M.	Lennoxville	Lennoxville.
Benoit, J. A.	Mt. St. Gregoire	Mt. St. Gregoire.
Bergeron, Ursin	Jonquière	Jonquière.
Bigras, Omer	Ste. Rose Ouest	Ste. Rose Ouest.
Bitumen Products Corp.	3590 St. Patrick St., Montreal	Papineau-Lochaber.
Blais, Joseph Engr.	10 Ave. Mont-Marie, Lévis	St. David.
Bonner Sand & Ballast, Ltd.	1434 St. Catherine St. W., Montreal	Durham tp.
Bouchard, Noel	Ste. Anne de Beaupré	Ste. Anne de Beaupré.
Brossard, Basile	Chicoutimi W.	Chicoutimi W.
Brouillet Sand & Gravel Co., Ltd.	Rawdon	St. Julien.
Cabana, Alphonse	Contrecoeur	Contrecoeur.
Canadian Good Roads Construction, Ltd.	2020 Union Ave., Montreal	Various.
Canadian Johns-Manville Co.	Asbestos	Shipton tp.
Coaticook, Town of	Box 150, Coaticook	Coaticook.
Compagnie de Sable Ltée, La	10-3e Ave., Limoilou, Quebec	St. Charles River.
Consolidated Oka Sand & Gravel Co., Ltd.	248 McCord St., Montreal	Lake of Two Mountains.
Deslandes, Léonard	St. Dominique	St. Dominique.
Deslandes, Mastai	St. Dominique	St. Dominique.
Dominion Sand & Stone Co., Ltd.	1092 Panet St., Montreal	South Durham.
Dontigny, P.	112 Station Ave., Shawining Falls	Shawining Bay.
Dubreuil, Albert	St. Dominique	St. Dominique.
Dutrisac, Noël	Ste. Rose	Ste. Rose.
Gauthier & Tremblay	164 Racine St., Chicoutimi	Rivière du Moulin.
Gosselin, Mde. Vve. F. X.	Box "U", Chicoutimi	Chicoutimi.
Grandmaitre, Donat	Eastview	Eastview.
Harvey, Adjuitor	St. Joseph d'Alma	St. Joseph d'Alma.
Houde, Dr. J. B. F.	28-30 du Platon, Three Rivers	Three Rivers.
Independent Sand Co., Ltd.	4207 Old Orchard Ave., Montreal	Lake St. Peter.
Kemp, Walter	Ste Thérèse	Ste Thérèse.
Lagacé, Armand	Monument	Monument.
Laganière Houde & Cie	Grondines	Grondines.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Continued

Name	Head office address	Location
QUEBEC—Concluded		
Langevin, J. A.	St. Felix de Valois.	St. Felix de Valois.
Laporte, Joseph.	Joliette.	Joliette.
Latulippe, P. & A.	240 rue de la Ronde, Quebec.	St. Charles River.
Lebeau, Adélard.	St. Dominique.	St. Dominique.
Lemay, René.	St. Jérôme.	St. Jérôme.
Loranger, Pierre.	Cap de la Madeleine.	Cap de la Madeleine.
Loretteville Quarry.	610-612 St. Valier St., Quebec.	Quebec.
Magog, Town of.	Magog.	Magog.
Mallory, J. G.	Lennoxville.	Lennoxville.
Marchand, Euclide.	Mont Carmel.	Mont Carmel.
Moody, J. H.	Terrebonne.	Terrebonne.
Nantel, Louis.	Terrebonne.	Terrebonne.
Newton, Wellington.	Buckingham.	Buckingham.
Ogden Municipality.	Tomifobia.	Beebe.
Ouellet, Alphonse.	Hebertville.	Hebertville.
Perron, J. E.	129 Cartier St., Chicoutimi.	Chicoutimi.
Petre, Arthur.	70 St. Louis St., Valleyfield.	Valleyfield.
Plante, Arthur.	Stratford Centre.	Stratford Centre.
Point Calumet Sand Agencies Reg'd.	0650 Atwater Ave., Verdun, Montreal.	St. Joseph du Lac.
Quebec, City of.	City Hall.	Ste. Thérèse-Beauport.
Raymond, McDonnell & Co., Ltd.	660 St. Catherine St. W., Montreal.	L'Assomption and St. Gérard de Magella.
Rodger, David.	R. R. 1, Lachute.	Lachute.
Shawinigan, Engineering Co., Ltd.	107 Craig St. W., Montreal.	Windigo and Rapide Blanc.
Sherbrooke, City of.	City Hall, Sherbrooke.	Sherbrooke.
Standard Lime Co., Ltd.	Joliette.	St. Emelie.
Standard Sand & Gravel, Ltd.	St. Felix de Valois.	St. Felix de Valois.
Stratford, Municipality of.	Stratford.	Stratford.
Tetreault, Emile.	Mont St. Gregoire.	Mont St. Gregoire.
Thouin, Josephat.	Mascouche.	Mascouche.
Venne, Oscar.	Lachenaie.	Lachenaie.
Verreault, Elz., Ltée.	194 rue du Pont, Quebec.	Quebec.
ONTARIO—		
Acres, Edward.	Delaware.	Delaware tp.
Barbour, Norman.	Erin.	Erin tp.
Barnes, Wm. R. Co., Ltd.	243 Cumberland Ave., Hamilton.	Springvale, Waterdown, Brantford, Copetown and Hamilton.
Bauer, Otto.	R.R. 1, Bornholm.	Logan tp.
Birtch, James A.	Richmond.	Richmond.
Brantford, City of.	City Hall, Brantford.	Brantford.
Breen, M.	R. R. 5, London.	Middlesex co.
Cairns, H.	Eugenia.	Grey co.
Campbellford, Town of.	Box 339, Campbellford.	Campbellford.
Canadian Aggregates, Ltd.	Walkerville.	Burford.
Carroll Bros.	490 Elliott Square, Buffalo, U.S.A.	Sherkston.
Chambers, J. L.	Kerwood.	Middlesex co.
Chick, Thos. & Sons, Ltd.	351 McDougall St., Windsor.	Great Lakes.
Collins, Joseph.	Kenilworth.	Arthur tp.
Consolidated Sand & Gravel, Ltd.	402 Harbour Bldg., Toronto.	Durham, Paris, Waterford.
Cooke, Allan.	Galt.	Waterloo co.
Cook, Philip.	R. R. 1, Newton.	Mornington tp.
Corbett, Ed.	Ingersoll.	Dorchester S. tp.
Cornell, C. C.	Brantford.	Brantford.
Cornell, O. S.	St. George.	St. George.
Cowley, Mrs. Kate.	Tilbury.	Great Lakes.
Cox, Wm.	Navan.	Cumberland tp.
Cranston, Wm.	Auburn.	Wawanchs W. tp.
Cudmore, Mrs. Alice.	Hensall.	Huron co.
Cudmore, Mrs. Bertha.	R. R. 6, Thamesville.	Howard tp.
Curry, W. J.	R. R. 1, Woodstock.	Oxford W. tp.
Cuthbert, Charles.	R. R. 1, Curries.	Oxford W. tp.
Cutler, Wm. & Sons.	R. R. 2, Ilderton.	London tp.
Dominion Concrete Co., Ltd.	Box 103, Kemptville.	Gower tp.
Douglas, Edward.	Thamesford, 3.	Missouri W. tp.
Eccles, Mr.	Holstein.	Grey co.
Egerde, Wm.	Petersburg.	Waterloo co.
Ellis, Norman.	Bright.	Oxford co.
Empire, Limestone Co.	19 Hudson St., Buffalo, U.S.	Sherkston.
Farrell, Ed.	R. R. 3, Tiverton.	Bruce tp.
Ferris, Mr.	Dundalk.	Grey co.
Fewster, Stanley.	St. Mary's, R.R. 4.	Oxford co.
Fischer, Val.	Carlsruhe.	Grey Co.
Fitzgerald, Joseph.	Woodstock.	Woodstock.
Forwell, J. K. & Sons.	Kitchener.	Waterloo tp.
Forwell, N. E.	Kitchener.	Waterloo tp.
Foster, R. R.	86 Spadina Ave., Ottawa.	Nepean and Gloucester tps.
Frid Bros., Ltd.	Main W. and Macklin Sts., Hamilton.	Hamilton.
Gaunt, Russell.	Lucknow.	Kinloss tp.
Garbutt, W.	Moorefield.	Maryborough tp.
Hadley's Chatham, Ltd.	Chatham.	River Thames.
Halpenny, Lewis E.	R. R. 4, Arthur.	Arthur.
Hart, Geo.	R. R. 3, Woodstock.	Oxford co.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Continued

Name	Head office address	Location
ONTARIO—Concluded		
Hart, Jas.	R.R. 1, Gadshill	Easthope N. tp.
Henson, Earl	209 Park Row S., Hamilton	Ancaster tp.
Hills, E.	Moorefield	Maryborough tp.
Hinde Bros.	134 Northland Ave., Toronto	Toronto.
Hughes, Lloyd	R.R. 2, Tavistock	Zorra E. tp.
Hunt, Gerald	R.R. 3, Lambeth	Westminster tp.
Jago Concrete Product Co.	Summerville	Toronto tp.
Johnston, G. F.	R.R. 2, Wilton Grove	Westminster tp.
Johnston, J. A.	R.R. 4, London	Middlesex co.
Jones, J. D.	R.R. 2, Wilton Grove	Westminster tp.
Jupp, A. E. Construction Co., Ltd.	170 Berkeley St., Toronto	Brock tp.
Kennedy, Bert	R.R. 4, Ilderton	London tp.
Kerr, J. J.	Wingham	Wawanosh E. tp.
Kirk, Roy	Kirkton	Blanchard tp.
Learn, Harley	Aylmer	Bayham tp.
Leviness, S.	R.R. 3, Niagara Falls	Stamford.
Lichty, Rudy	R.R. 1, Milverton	Mornington tp.
Lovelace, E. J.	St. Catharines	St. Catharines.
MacDonald, John	R.R. 2, Thamesford	Oxford co.
Mack, Thos., Sr.	R.R. 4, Rockwood	Erin tp.
MacLeod, D. J.	Embro	Oxford co.
McCullum, Geo.	Grafton	Haldimand tp.
McGugan, D. A.	Alvinston	Lambton co.
McKenzie, W. J.	Arkona	Lambton co.
McKinnon, Mrs.	R.R. 6, Strathroy	Middlesex co.
McLaughlin, W. J.	Granton	Middlesex co.
McLean, A. B. & Sons	Sault Ste Marie	Great Lakes.
McMillan, James	Cumberland	Cumberland tp.
McVannell, Sam	Shelburne	Dufferin co.
Merritt, S. W.	Grassies P.O.	Grimsby S.
Monk, Ernest	Elmwood	Grey co.
Moon, Dr.	Clarksburg	Grey co.
Moore, John	Milton	Essex tp.
Mott, Byron	Norwich	Oxford co.
National Sand & Material Co., Ltd.	Harbour Bldg., Toronto	Great Lakes.
Newell, Herbert	R.R. 4, Aylmer	Malahide tp.
Northern Development Dept.	Parliament Bldgs., Toronto	Various.
O'Connell, Thos.	Kenilworth	Arthur tp.
Ontario Dept. of Highways	Toronto	Various.
Ontario Gravel & Transport Co., Ltd.	Sarnia	Great Lakes.
Paris, Town of	Grand River St., Paris	Paris.
Peterborough, City of	133 Simcoe St., Peterborough	Smith tp.
Petty, W. P.	Pickering	Pickering tp.
Pyke Salvage Co., Ltd.	506 Princess St., Kingston	Lake Ontario.
Reist, Addison	R.R. 2, Drayton	Peel tp.
Rice, Archie	R.R. 7, Woodstock	Zorra E. tp.
Riordan, Wm.	R.R. 3, St. Mary's	Blanchard tp.
Robinson, James	Science Hill	Stephen tp.
Robinson, W. J.	R.R., Crediton	Brantford tp.
Rogers, A. M.	R.R. 5, Brantford	Pickering tp.
Sadin, John	Brougham P.O.	Blyth.
Sanderson Bros.	Blyth	London tp.
Scott, Jas.	Denfield, R.R. 2	Waterloo co.
Seegmiller, E. & E.	Kitchener	Lake Superior.
Sin-Mac Lines, Ltd.	635 Common St., Montreal, Que.	Usborne tp.
Skinner, Russell	Exeter	Elderslie tp.
Slumskie, A. D.	Dobbinson	Peel tp.
Smith, Ezra	Alma	Woolwich tp.
Stroh, Walter	Conestogo	London tp.
Tack, Henry	London P.O., Sub. 1.	Dufferin co.
Taylor, Edward	Grand Valley	Lake Ontario, etc.
Tees, Transit Co.	123 Bold St., Hamilton	Hullett tp.
Thompson, Wm.	Seaforth	Arthur.
Towland Construction Co., Ltd.	195 London Road, Guelph	Garafraxa W. tp.
Vallery, Frank	Belwood	Derby tp.
Vokes, E. J.	R.R. 3, Owen Sound	Great Lakes.
Wallaceburg Sand & Gravel Co., Ltd.	Wallaceburg	Orford tp.
Ward, J. H.	Highgate	Waterloo co.
Warnholz and Bast.	Kitchener	Dufferin co.
Wattam, Wm.	Shelburne	Walpole tp.
Weaver, Joel	Selkirk	Hay tp.
Welsh, Thos.	Hensall	Grey co.
Wolfe, H.	Carlsruhe	Leamington.
Woollatt Fuel & Supply Co., Ltd.	109 Ottawa St., Walkerville	Oxford co.
Youngs, John	R.R. 1, Embro	
MANITOBA—		
Braid Builders' Supply	Water St. E., Winnipeg	Birds Hill.
Brandon, City of	City Hall, Brandon	Brandon.
Building Products & Coal Co., Ltd.	Christie St., Winnipeg	Birds Hill and Woodlands.
Cumming & Dobbie	233 Ninth St., Brandon	Brandon.
Cusson, J. A.	St. Boniface, Brandon	Ste Anne des Chênes.
Greater Winnipeg Water District	Civic Offices, Winnipeg	1 Mile 30 and Mile 80, G.W. W.D. Ry.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Concluded

Name	Head office address	Location
MANITOBA—Concluded		
Keedian, James.....	Birds Hill.....	Birds Hill.
Manitoba Dept. of Highways.....	Winnipeg.....	Various.
McCurdy Supply Co., Ltd.....	49 Notre Dame E., Winnipeg.....	N.E. $\frac{1}{4}$, Sec. 36, T. 11-R. 43, E.; N. $\frac{1}{2}$ of N.W. $\frac{1}{4}$, Sec. 32, T. 11-R. 5, E.
North West Gravel & Coal Co., Ltd.....	604 Great West Permanent Bldg., Winnipeg.	Springfield.
Riley, W. J.....	Molson.....	S. $\frac{1}{4}$ N.E. $\frac{1}{4}$, Sec. 28, T. 12, R-9 E.
SASKATCHEWAN—		
National Parks Branch.....	Ottawa.....	Various.
North Battleford, City of.....	City Hall, North Battleford.....	S.E. $\frac{1}{4}$, 16, 44, 16, W. 3rd.
Saskatchewan Dept. of Highways.....	Regina.....	Various.
Yorkton, City of.....	Box 730, Yorkton.....	Yorkton.
ALBERTA—		
Alberta Dept. of Highways.....	Edmonton.....	Various.
Nanton, Town of.....	Nanton.....	Nanton.
National Parks Branch.....	Ottawa.....	Various.
Spoke, J. C.....	Perryvale.....	Perryvale.
Sutherland, Moses.....	Olds.....	Olds.
BRITISH COLUMBIA—		
Armstrong, City of.....	Armstrong.....	Armstrong.
B.C. Dept. of Highways.....	Victoria.....	Various.
B. C. Sand & Gravel Co., Ltd.....	163 W. Hastings St., Vancouver.....	Lynnmuir.
Burnaby, Corp. of the Dist. of.....	Edmonds.....	Dist. of Burnaby.
Britannia Sand & Gravel Co., Ltd.....	1901 W. Georgia St., Vancouver.....	Britannia Beach.
Cascade Rock & Gravel Co., Ltd.....	410 Seymour St., Vancouver.....	N. Vancouver.
Chilliwack, City of.....	Chilliwack.....	Tp. of Chilliwack.
Consolidated Mfg. & Smelting Co. of Canada.	Trail.....	Tadanao.
Deeks Sand & Gravel Co., Ltd.....	101-1st Ave. W., Vancouver.....	N. Vancouver and Coquit- lam.
Freshwater Sand & Gravel Co., Ltd.....	902 Columbia St. W., New Westminster.....	Port Coquitlam.
Hillside Sand & Gravel, Ltd.....	1075 Main St., Vancouver.....	Hillside.
Kamloops, City of.....	Box 360, Kamloops.....	Kamloops.
National Parks Branch.....	Ottawa.....	Various.
Nelson, City of.....	City Hall, Nelson.....	Nelson.
Port Alberni, City of.....	Port Alberni.....	Port Alberni.
Port Coquitlam, City of.....	Port Coquitlam.....	Port Coquitlam.
Prince Rupert, City of.....	City Hall, Prince Rupert.....	Prince Rupert.
Producer's Sand & Gravel Co., Ltd.....	1902 Store St., Victoria.....	Royal Bay.
Swinerton R. H., J. Musgrave & Est. B. Wilson.....	320 Broughton St., Victoria.....	Metchosin.
Trail, City of.....	Trail.....	Trail.
West Kootenay Power & Light Co., Ltd.....	Trail.....	Kootenay Dist.

Stone Quarrying Industry

Granite

NOVA SCOTIA—		
Bower, A. R.....	Box 255, Shelburne.....	Birchtown and Shelburne.
*Dauphinee, A. T.....	Shelburne.....	Birchtown and Shelburne.
*Hoyt, C. M.....	Middleton.....	Middleton.
Nova Scotia Department of Highways.....	Halifax.....	Various.
*Rice Bros.....	Lawrencetown.....	Nictaux West.
*Rice, W. D.....	Middleton.....	Nictaux West.
NEW BRUNSWICK—		
Connolly, J. E. and D. P.....	Bathurst.....	South Bathurst.
*Granite Street Pavement & Construction Co., Ltd.....	Hampstead.....	Hampstead.
*Meating, Epps Company, Ltd.....	Box 66, St. George.....	Bayside and St. George.
*Milne, Cutts & Co., Ltd.....	St. George.....	St. George.
*Mooney, B., & Son, Ltd.....	112 Queen St., Saint John.....	Hampstead.
*O'Brien & Baldwin.....	St. George.....	St. George.
QUEBEC—		
B. & R. Granite Quarry.....	Beebe.....	Beebe.
*Bernier and Sons.....	Box 491, Roberval.....	Roberval.
Bérubé, Lucien, and Sons.....	Brownsburg.....	Brownsburg.
Bourbonnais, J. A.....	Vaudreuil Station.....	Rigaud.
*Brodie's, Ltd.....	1070 Bleury St., Montreal.....	Mount Johnson, Graniteville, Guennette.
*Bussière, Amédée.....	Ste. Cecile, Compton Co.....	Ste Cecil.
Chicoutimi, City of.....	Chicoutimi.....	Chicoutimi.
*Cloutier Bros.....	Beebe.....	Beebe.
*Delwaide, Anselme.....	Chicoutimi.....	Rang St. Thomas, Rivière du Moulin.

DIRECTORY OF FIRMS—Continued

Stone Quarrying Industry—Concluded

Name	Head office address	Location
Granite—Concluded		
QUEBEC—Concluded		
Dontigny, Alphonse.....	Shawinigan Falls.....	Ste Flore.
*Dumas, August.....	Rivière à Pierre.....	Rivière à Pierre.
*Granite Company.....	88 St. Louis Road, Quebec.....	Rivière à Pierre.
Grenier, E.....	Glenada.....	Glenada.
*Gingras et Frère Ltée.....	St. Marc des Carrières.....	Stanhope.
*Haselton, Wm. M.....	Beebe.....	Stanstead.
Highways, Dept. of, Quebec.....	Quebec.....	Various.
Lacasse and Boulais.....	Box 23, Beebe.....	Beebe.
McIntosh, Robert.....	Beebe.....	Beebe.
*McKenzie and Morrison.....	Scotstown.....	Hampden tp.
*Moreau, Polycarpe.....	Roberval.....	Roberval.
*National Granite Reg'd.....	Box 276, Roberval.....	St. Gédéon.
*Nett, Olson, Hokanson & Henrikson.....	Beebe.....	Graniteville.
Perron, Arthur.....	Rivière à Pierre.....	Rivière à Pierre.
Shawinigan Falls, City of.....	Shawinigan Falls.....	Almaville.
Shawinigan Engineering Co., Ltd.....	107 Craig St., Montreal.....	Rapide Blanc.
*Silver Granite Co., Ltd.....	117 Cote d'Abraham, Quebec.....	St. Samuel Sta.
St. Bruno Quarry & Paving Co., Ltd.....	7420 De Larocche St., Montreal.....	St. Bruno.
*Stanstead Granite Quarries Co., Ltd.....	Beebe.....	Graniteville.
*Thibaudeau and St. Pierre.....	Rivière à Pierre.....	Portneuf.
Truchon, E. R.....	Box 448, Roberval.....	Jonquière.
*Vover, F., et Frère.....	Rivière à Pierre.....	Rivière à Pierre.
*Wilkinson, Frank L.....	Beebe.....	Stanstead.
ONTARIO—		
Bradley, Wm.....	81 Garden St., Gananoque.....	Gananoque.
*Building Products, Ltd.....	Box 2529, Montreal, P.Q.....	Verona.
Fort William, City of.....	Fort William.....	Mount McKay.
Hall, R. R., Estate.....	Parry Sound.....	Parry Sound.
*Horne, Wm.....	Butler, via Ignace.....	Butler.
*McKee, Wm.....	R.R. 3, Lansdowne.....	Escott.
Ontario Rock Co., Ltd.....	1501 Canada Permanent Bldg., Toronto.....	Belmont and Methuen tps.
MANTOBA—		
*Winnitoba Marble Co., Ltd.....	1180 Wall St., Winnipeg.....	Darwin and Hawk Lake.
BRITISH COLUMBIA—		
*B. C. Monumental Works, Ltd.....	154-8th Ave. E., Vancouver.....	Granite Island.
Coast Quarries, Ltd.....	931 Marine Bldg., Vancouver.....	Burrard Inlet.
Canadian National Railways.....	Vancouver.....	Copper Creek.
Canadian Pacific Railway.....	Montreal, P.Q.....	Golden and Ashcroft M.D.
Gilley Bros., Ltd.....	902 Columbia St. W., New Westminster.....	New Westminster.
*Nelson Granite and Monumental Co.....	Box 865, Nelson.....	Nelson.
Prince Rupert, City of.....	Prince Rupert.....	Prince Rupert.
*Vancouver Granite Co., Ltd.....	1007 Royal Bank Bldg., Vancouver.....	Nelson Island.
*Vernon Granite & Marble Co.....	Okanagan Landing.....	Okanagan Landing.
*Wilson, James S.....	Sirdar.....	Sirdar.
Limestone		
NOVA SCOTIA—		
Bradram-Henderson, Ltd.....	Montreal, P.Q.....	Whyoccomagh.
Eastern Lime Co., Ltd.....	Windsor.....	Windsor.
Nova Scotia Department of Agriculture.....	Halifax.....	Pugwash.
Nova Scotia Department of Highways.....	Halifax.....	Various.
MacLean & Co.....	Oxford.....	Nappan.
Mersey Paper Co., Ltd.....	Liverpool.....	East River.
NEW BRUNSWICK—		
Brookville Manufacturing Co., Ltd.....	Brookville.....	Brookville.
Gilbert, Geo. S.....	Bathurst.....	Elm Tree.
Randolph & Baker, Ltd.....	Randolph.....	Randolph.
Snowflake Lime, Ltd.....	3 Pokiok Road, Saint John.....	Saint John.
Saint John Lime Co.....	Brookville.....	Brookville.
QUEBEC—		
Arcand, Honoré.....	Grondines.....	Grondines.
Arseneau, Honore Z.....	St. Jean l'Evangeliste.....	St. Jean l'Evangeliste
St. Barthelemy Quarry.....	St. Barthélemi.....	St. Barthélemi.
Baillargeon & Faubert.....	62 Union Bldg., St. Lambert.....	Caughnawaga.
*Beaucauge, A. D. J.....	St. Marc des Carrières.....	St. Marc des Carrières.
Beaudet & Bergeron.....	St. Antoine de Tilly.....	St. Laurent.
*Beaudry, J. Pitre.....	Taché St., Joliette.....	Joliette.
Boily, Albert.....	Baie St. Paul.....	Baie St. Paul.
Canada Cement Co., Ltd.....	Box 290, Station B, Montreal.....	Hull.

NOTE.—*Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Limestone—Continued

Name	Head office address	Location
QUEBEC—Concluded		
Canadian Rock Products, Ltd.	2020 Union Ave., Montreal.	South Stukely.
Cercle Agricole de St. Godfroy	St. Godfroy	St. Godfroy.
Delorimier & Rogers Quarries, Ltd.	4901 Iboville, Montreal.	Montreal.
*Department of Justice.	Ottawa, Ont.	St. Vincent de Paul.
*Deschambault Quarry Corp.	52 St. Paul St., Quebec.	St. Marc des Carrières.
Dominion Lime Co.	Lime Ridge	Lime Ridge.
Durocher, Cyrille	11021 Notre Dame East, Montreal.	Montreal E.
Foundation Co. of Canada, Ltd.	1538 Sherbrooke St. W., Montreal.	Masson.
Fuger & Smith, Ltd.	Pointe Claire.	Pointe Claire.
Gaspesian Fertilizer Co.	Port Daniel East.	Port Daniel E.
Gagné, Octave.	St. Ulric.	St. Ulric.
*Gauthier, Olivier.	St. Marc des Carrières	St. Marc des Carrières.
Giffard Quarry, Ltd.	71 St. Peter St., Quebec.	Giffard.
*Gingras et Frère Ltée.	St. Marc des Carrières	St. Marc des Carrières.
Giroux, F. X.	St. Louis de Courville	St. Louis de Courville.
*Gravel, Edouard Lazare.	Chateau Richer	Chateau Richer.
Guilbault Frères et Cie.	Ste. Elizabeth	Ste. Elizabeth.
Kennedy Construction Co., Ltd.	407 McGill St., Montreal.	Actonvale.
Laberge & Marchand.	Box 63, Chateauguay Bassin.	Chateauguay.
Lacouline, T.	Chateau Richer	Chateau Richer.
Lagacé, Napoleon.	St. Martin.	St. Martin.
Laurendeau, A. & Co., Ltd.	10 St. James St. W., Montreal.	Lachute.
*Lapointe, A. & E.	12034 Lachapelle St., Montreal.	Cartierville.
Lapointe, Emile.	St. Dominique Bagot.	St. Dominique.
Laurentian Stone Co., Ltd.	195 Nicholas St., Ottawa, Ont.	Hull.
Laval Quarry Co., Ltd.	6418 St. Hubert St., Montreal.	Cap St. Martin.
Leclerc & Day.	Rimouski	St. Jean l'Evangeliste.
Leclerc & Robitaille, Enrg	Roberval	Roberval.
*Lecrenier, Victor	8434 De Gaspé, Montreal.	Cap St. Martin.
Maisonneuve Quarry Co., Ltd.	4740 Iberville St., Montreal.	Montreal.
Marcel Quarry, Ltd.	St. Michel Station	Ste Clothilde de Chateau- guay.
*Martineau & Sons, Ltd.	517 E. Marie-Anne St., Montreal.	St. Marc and Pont Viau.
Matthew Devito Construction, Ltd.	6138 Hamilton St., Montreal.	Pointe Claire.
Miner, R. H., Co., Ltd.	7411 Delanaudière St., Montreal.	St. Laurent.
Montreal Quarry, Ltd.	1340 Bellechasse St., Montreal.	Montreal.
Montreal Stone Products, Ltd.	8500 St. Hubert St., Montreal.	Montreal.
National Quarries, Ltd.	Park Ave. and Beaubien St., Montreal.	Cote St. Michel.
Naud, Oscar.	Lachevrotière	St. Marc des Carrières.
*Noel, Oscar.	44 Wright St., Hull.	Wrightville.
Page, Joseph.	Charlesbourg West.	Charlesbourg West.
*Paquette, Levis & Co.	Cap St. Martin.	St. François de Sales.
Quebec Highways Dept.	Quebec.	Various.
Schetagne, Wilfrid.	309 Bord du Lac, Pointe Claire	Pointe Claire.
Shawinigan Chemicals, Ltd.	Box 2670, Craig St. Station, Montreal.	Bedford.
St. Louis Quarry, Reg.	St. Louis de Champlain.	St. Louis de Champlain.
St. Lawrence Quarry, Ltd.	Cap St. Martin.	Cap St. Martin.
St. Maurice Quarry, Ltd.	307 Alexandre St., Three Rivers.	St. Louis de France.
St. Onge, O. F.	St. Dominique Bagot.	St. Dominique Bagot.
Standard Lime Co., Ltd.	Joliette.	St. Paul de Joliette.
Standard Clay Products, Ltd.	Box 819, St. John's.	St. John's.
Stinson-Reeb Builders Supply Co., Ltd.	360 Dorchester St. W., Montreal.	Côte St. Michel.
Theoret, Magloire.	Box 128, Bellerive, Valleyfield.	Valleyfield.
Trappist Fathers.	Mistassini.	Lac St. Jean.
Tremblay, Napoleon.	31 Joffre Ave., Hull.	Hull.
Union Quarry, Ltd.	1340 Bellechasse St., Montreal.	Côte St. Michel.
Valleyfield, City of.	Valleyfield.	Valleyfield.
Verreault, E., Ltd.	194 Bridge St., Quebec.	Giffard.
Villeneuve, François.	Pointe a Pic.	Pointe a Pic.
Villay Quarry Co., Ltd.	4740 Iberville St., Montreal.	Montreal.
Vincelette, Paul.	St. Honoré.	St. Honoré.
ONTARIO—		
American Cyanamid Co.	30 Rockefeller Plaza, New York City, U.S.A.	Beachville.
Bourgie, J. B.	Box 50, Embrun.	Embrun.
Brulé, E. D. & Sons, Ltd.	Box 116, Billings Bridge.	Billings Bridge.
Brunner, Mond Canada, Ltd.	501 Dominion Bank Bldg., Toronto.	Amherstburg.
Canada Cement Company, Ltd.	Box 290, Station B., Montreal, P.Q.	Belleville.
Canada Crushed Stone Corp., Ltd.	Sun Life Bldg., Hamilton.	Dundas, Hagersville and Hastings co.
Coldwater Crushed Stone, Ltd.	Coldwater	Coldwater.
Cook, J. S.	Wiaraton.	Wiaraton.
Decewsville Crushed Stone Co., Ltd.	52 Elgin St., Hamilton.	Cayuga tp.
Department of Provincial Secretary	Toronto.	Guelph.
Dibblee Construction Co., Ltd.	246 Albert St., Ottawa.	Carleton co.
Foster, R. R.	86 Spadina Ave., Ottawa.	Carleton co.
Gordon Crushed Stone Co., Ltd.	465 Bay St., Toronto.	Hagersville.
Grenville Crushed Rock Co., Ltd.	917 Keefer Bldg., Montreal, P.Q.	Oxford Mills.
Gypsum, Lime and Alabastine, Canada, Ltd.	Paris.	Beachville, Hespeler and Milton.
Hagersville Quarries, Ltd.	Hagersville.	Hagersville.
Halliday, Fred.	Cummings Bridge.	Gloucester tp.
Harvey, W. H., & Son Construction Co., Ltd.	56 Kensington Ave., Kingston.	Dundas co.

DIRECTORY OF FIRMS—Continued

Limestone—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Innerkip Quarries, Ltd.	Fleet and Bathurst Sts., Toronto	Innerkip.
Jamieson Lime Co.	Renfrew	Horton tp.
*Kingston Penitentiary	Kingston	Portsmouth.
Kirby, T. Sidney, Co., Ltd.	215 Sussex St., Ottawa	Gloucester tp.
Kirkfield Crushed Stone, Ltd.	Fleet and Bathurst Sts., Toronto	Kirkfield.
Lally, Mary F.	Box 39, Smithville	Smithville.
Limestone Products, Ltd.	1104 Hermant Bldg., Toronto, 2	N. Orillia tp.
Merritt, Sidney W.	Grassies P.O.	Vinemount.
Noranda Mines, Ltd.	Royal Bank Bldg., Toronto	Haileybury.
Owen Sound, City of	Owen Sound	Owen Sound.
Pembroke, Town of	Pembroke	Pembroke.
Pirson, John	Stevensville	Ridgemount.
Puslinch Quarry, Ltd.	Sun Life Bldg., Hamilton	Puslinch.
*Queenston Quarries, Ltd.	Sun Life Bldg., Hamilton	Niagara tp.
Quinton, W. G.	Jasper	Jasper.
Raynor Construction Co., Ltd.	159 Bay St., Toronto	Frankville.
Routly Construction Co.	21 Dundas Square, Toronto	Bastard, Mara and Garafra tps.
Simcoe Marble & Stone	Longford Mills	Rama tp.
Walker Bros., Ltd.	Box 586, Thorold	Stamford tp.
Wehman, John	251 Division St., Kingston	Kingston tp.
Welland Ship Canal	St. Catharines	St. Catharines.
Windmill Point Crushed Stone Co., Ltd.	225 Sterling Road, Toronto	Ridgeway.
Wilford, F. R., & Co., Ltd.	Box 119, Lindsay	Verulam tp.
NOTE.—In addition to the above, counties, townships and the Department of Highways reported production.		
MANITOBA—		
*Gillis Quarries, Ltd.	Richard and Spruce Sts., Winnipeg	Garson and Poplarfield.
*Tyndall Quarry Co., Ltd.	1591 Erin St., Winnipeg	Garson.
*Western Stone Co., Ltd.	205 Confederation Life Bldg., Winnipeg	Garson.
Winnipeg, City of	Winnipeg	Stony Mountain.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg	Spearhill and Stonewall.
ALBERTA—		
Loder's Lime Co., Ltd.	Kananaski	Kananaskis.
Summit Lime Works	Box 273, Lethbridge	S. $\frac{1}{2}$ Sec. 7, Tp. 8, R. 5, W. 5.
BRITISH COLUMBIA—		
B.C. Department of Highways	Victoria	Various.
Beale, F. J., Lime Stone Quarries	Van Anda	Van Anda and Bella Bella.
British Columbia Pulp & Paper Co., Ltd.	Bank of Nova Scotia Bldg., Vancouver	Quatsino Sound.
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail	Kimberley.
Deeks Sand & Gravel Co., Ltd.	101-1st Ave. W., Vancouver	North Vancouver and Coquitlam.
Pacific Lime Co., Ltd.	744 West Hastings St., Vancouver	Blubber Bay, Texada Isd.
Priore & Vannuchi	Box 315, Trail	Fife.
Rosebank Lime Co.	602 Pacific Bldg., Hastings St. W., Vancouver	Esquimalt.

Marble

QUEBEC—		
Canada Marble and Lime Co.	630 Cathcart St., Montreal	L'Annonciation.
Wallace Sandstone Quarries, Ltd.	Architects Bldg., Montreal	Philipsburg.
White Grit Co.	Hurdman Road, Ottawa, Ont.	Portage du Fort.
ONTARIO—		
Bolender Bros.	Haliburton	Haliburton.
Marble & Stone Co. of Canada, Ltd.	250 Madison Ave., Toronto	Marmora.
Rock Construction Co., Ltd.	328 Dupont St., Toronto	Bancroft.
Silvertone Black Marble Quarries	339 Queen St., Ottawa	St. Albert.
BRITISH COLUMBIA—		
Canadian Marble Granite Works, Ltd.	10702-101st St., Edmonton, Alberta	Marblehead.

Sandstone

NOVA SCOTIA—		
Fairview Crushed Stone Co., Ltd.	609 Gottingen St., Halifax	Halifax co.
Wallace Sandstone Quarries, Ltd.	1135 Beaver Hall Hill, Montreal, P.Q.	Wallace.
NEW BRUNSWICK—		
*Smith, E. A.	Shediac	Shediac.

DIRECTORY OF FIRMS—Concluded

Sandstone—Concluded

Name	Head office address	Location
QUEBEC—		
Beauharnois Light, Heat & Power Co.....	Power Bldg., Montreal.....	Beauharnois.
Blais, Jos., Reg.....	10 Mont Marie Ave., Levis.....	St. Nicholas and St. Louis de Pintendre.
Broughton Soapstone & Quarry Co., Ltd.....	Broughton Station.....	Ste Hénédine.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	Boischatel.
Department of Highways.....	Quebec.....	Various.
Gagnon, L. P.....	St. David, Levis.....	St. David.
Montmagny, Town of.....	Montmagny.....	Montmagny.
Sherbrooke, City of.....	Sherbrooke.....	Sherbrooke.
Taylor, John.....	R.R. 4, Granby.....	Granby.
Vézina, Jos., Reg.....	Ste. Foy.....	Ste Foy.
ONTARIO—		
Corners, Austin.....	Terra Cotta.....	Chinguacousy tp.
Eves, C., Stone Quarries.....	Terra Cotta.....	Terra Cotta.
Logan, Harry.....	Box 400, Georgetown.....	Georgetown.
McAlpine Bros.....	Milton.....	Milton.
Norrie & McHarg.....	R.R. 4, Acton.....	Limehouse.
Norton, A. W., Stone Quarries.....	Limehouse.....	Glen Williams.
Presswood & Gibbs.....	Box 146, Glen Williams.....	Esquesing tp.
Sykes, Thos.....	Georgetown.....	Georgetown.
Terra Cotta Quarries.....	Terra Cotta.....	Esquesing tp.
ALBERTA—		
*Oliver, Wm.....	1828-18th St. W., Calgary.....	near Cochrane.
BRITISH COLUMBIA—		
Canadian Pacific Railway Co.....	Montreal.....	Revelstoke M.D.
Cranbrook, City of.....	Cranbrook.....	Cranbrook.
*McDonald, C. H., and J. A.....	1571 Main St., Vancouver.....	Gabriola Island.
Slate		
BRITISH COLUMBIA—		
Kennedy, J. J.....	Sooke Lake.....	Sooke Lake.

INDEX

A	PAGE		PAGE
Abrasive, artificial.....	164	Auriferous quartz mining industry.....	17, 46
Abrasive, natural (including data on corundum, diatomite, garnets, grindstones, grinding pebbles, pulpstones, sharpening stones and volcanic dust).....	19, 159	Capital.....	17, 52
Capital.....	19, 162	Employment.....	17, 24, 54
Employment.....	19, 24, 162	Fuel and electricity.....	17, 28
Exports.....	163	Number of plants.....	17
Fuel and electricity.....	19	Ores, concentrates and slags shipped.....	17, 53
Imports.....	163	Ores mined, milled and crude bullion produced.....	53
Number of firms.....	19	Power employed.....	34
Power employed.....	35	Principal statistics.....	17
Principal statistics.....	19	Wage-earners.....	26, 54
Production.....	162		
Value of shipments.....	19	B	
Wage-earners.....	26	Ball clay.....	212
Accidents.....	35	Barytes.....	192
Actinolite.....	191	Imports.....	192
Production.....	192	Production.....	192
Acton Plant.....	132	Base Metals Mining Corporation.....	64
Alberta.....	16	Bauxite.....	106
Capital.....	23	Beattie mine.....	47
Employment.....	23	Bentonite.....	211
Fuel and electricity.....	23, 32	Beryllium.....	108
Number of plants.....	32	Big Missouri Mine.....	108
Power employed.....	34	Bismuth.....	236
Principal statistics.....	23	Method of computing value.....	100
Production.....	7, 16, 44	World production.....	100
Review.....	51	Bituminous sands.....	193
Wage-earners.....	26	Imports of asphalt.....	193
Algoma Steel Corporation.....	113	Production.....	193
Alluvial Gold Mining Industry.....	17, 43	Black Donald Graphite Co. Ltd.....	194
Capital.....	17, 45	Blister copper.....	87
Employment.....	17, 24, 45	Bog iron ore (See iron oxides).....	20, 177
Fuel and electricity.....	17, 28, 45	Bonanza mine.....	57
Number of plants.....	17, 45	Bralorne mine.....	51
Power employed.....	34	Brass.....	96
Principal statistics.....	45	Brick, building.....	216
Value of shipments.....	17, 45	Production.....	216
Wage-earners.....	26	Brick, paving.....	217
Alumina.....	104	Brick, sand-lime.....	228
Aluminium.....	104, 131	Brick and tile.....	217
Exports.....	105	Principal statistics.....	21
Imports.....	105	Bridge river area.....	51
Prices.....	104	Britannia mine.....	57, 84, 81
World production.....	105	Britannia Mining and Smelting Co. Ltd.....	94
World production of bauxite.....	106	British Columbia.....	16
Aluminum Company of Canada.....	104, 131	Capital.....	23
Anhydrite.....	172	Employment.....	23
Anthracite.....	140	Fuel and electricity.....	23, 32
Antimony.....	106	Number of plants.....	23
Imports.....	107	Power employed.....	34
Prices.....	107	Principal statistics.....	23
Production.....	107	Production.....	7, 16
World production.....	107	Review.....	51, 64
Anyox section.....	57, 134	Wage-earners.....	26
Apatite.....	199	Brunner, Mond Canada, Ltd.....	183
Arntfield mine.....	47	Bussière mine.....	47
Arsenic.....	61, 68		
Exports.....	69	C	
Imports.....	69	Cadmium.....	109
Method of computing value.....	236	Calcium.....	110
Prices.....	12	Calcium arsenate.....	68
Production.....	69	Canada.....	
World production.....	69	Accidents.....	35
Artificial gas.....	145	Capital.....	23
Arvida plant.....	131	Employment.....	23, 24
Asbestos.....	164	Exchange.....	11
Capital.....	19, 166	Exports (See individual minerals).....	7
Employment.....	19, 24, 166	Foreign trade.....	7
Exports.....	167	Fuel and electricity.....	23, 28
Fuel and electricity.....	19, 28	Imports (See individual minerals).....	
Imports.....	167	Mineral production values.....	7, 13
Number of mines.....	19	Number of operating mines.....	23
Power employed.....	34	Percentage of production by provinces.....	13
Principal statistics.....	19	Power employed.....	34
Production.....	167	Prices, metal.....	12
Shipments.....	19, 167	Principal statistics.....	23
Wage-earners.....	26, 166	Production.....	10
World production.....	168	Wage-earners.....	26
Ashley mine.....	50	Canadian Gypsum Co.....	173
Asphalt (See Bituminous Sands).....	155	Canadian Copper Refiners Ltd.....	93, 125, 132
Atlin District.....	44	Canadian Flint & Spar Co.....	168
		Canadian Industries Ltd.....	184

INDEX—Continued

	PAGE		PAGE
Capital employed (also under individual industries).....	17	Copper-gold-silver mining industry.....	18, 54
Cariboo district.....	43, 51, 52	Capital.....	18, 58
Caustic soda.....	184	Employment.....	18, 24, 59
Cement.....	208	Fuel and electricity.....	18, 28
Capital.....	21, 209	Number of plants.....	18
Consumption.....	210	Ore mined and milled.....	58
Employment.....	21, 25, 210	Power employed.....	34
Exports.....	210	Principal statistics.....	18
Fuel and electricity.....	21, 28	Shipments.....	18, 59
Imports.....	210	Wage-earners.....	26, 59
Power employed.....	35	Copper Cliff.....	87, 94, 132
Principal statistics.....	21	Copper sulphate.....	95
Production.....	210	Corundum.....	159
Sales.....	210	Creighton mine.....	87
Wage-earners.....	26	Crushed stone.....	337
China clay.....	215, 220	Cryolite.....	106
Chromite.....	110	Curbstone.....	234
Imports.....	111		
Production.....	111	D	
World production of chrome ore.....	112	Deloro Smelting and Refining Co.....	61, 68, 70, 108, 133
Chromium.....	110	Diatomite.....	159
Clay and Clay Products, including data for fire-clay, fireclay blocks and shapes, brick made by different processes, structural tile, drain tile, sewer pipe and pottery.....	207, 211	Production.....	159, 162
Capital.....	21, 212	Dome Mines Ltd.....	47, 48
Employment.....	21, 25, 213	Dominion Steel and Coal Co., Ltd.....	205
Exports.....	208, 215	Drain tile.....	218
Fuel and electricity.....	21, 28		
Imports.....	208, 215	E	
Number of plants.....	21	Explanatory notes.....	236
Power employed.....	35	Eldorado Gold Mines Ltd.....	65, 124, 133
Principal statistics.....	21	Electricity (See fuel and electricity).....	33
Production.....	213-219	Emery.....	159
Production from imported clays.....	214, 220	Employment (also see under individual industries).....	24
Review.....	211	Epsom salts.....	165, 197
Wage-earners.....	26, 213	Errington mine.....	64
Clay products and other structural materials, including cement, clay and clay products, lime, sand and gravel, sand-lime brick, slate and stone.....	207	Eustis mine.....	54
Production (See also cement, clay and clay products, lime, sand and gravel, sand-lime brick, slate and stone).....	208	Exchange table for Canadian and United States dollar and Sterling.....	11
Coal mining.....	19, 136		
Capital.....	19, 137	F	
Consumption.....	142	Falconbridge Nickel Mines Ltd.....	56, 87, 88, 94, 100, 132
Disposition.....	139	Feldspar.....	168
Employment.....	19, 24, 137	Feldspar and quartz mining industry.....	20
Exports.....	141	Capital.....	20, 169
Fuel and electricity.....	19, 28	Employment.....	20, 24, 169
Imports.....	140	Exports.....	20, 170
Number of firms.....	19	Fuel and electricity.....	20, 28
Power employed.....	34	Imports.....	170
Principal statistics.....	19	Number of mines.....	20
Production.....	138	Power employed.....	35
Shipments.....	19, 139	Principal statistics.....	20
Wage-earners.....	26, 137, 138	Production.....	170
World production.....	143	Wage-earners.....	26, 169
Coal mining, Coke, Natural Gas, Peat and Petroleum Industries in Canada.....	136	World production.....	170
Cobalt (See silver-cobalt mining industry).....	61, 70	Ferro-alloys.....	117, 119
Method of computing value.....	237	Ferrosilicon.....	115
Exports.....	71	Firebrick.....	219
Prices.....	70	Fireclay.....	219
Production.....	70, 71	Firebrick and other fireclay products.....	219
World production.....	71	Fireclay blocks and shapes.....	219
Cobalt district.....	61, 62, 70	Flint Flon mine.....	56, 64, 93
Coke.....	145	Flint (See quartz).....	217
Exports.....	146	Floor tile.....	193
Imports.....	146	Fluorspar.....	87
Principal statistics.....	146	Frood mine.....	136
Production.....	146	Fuels (See coal mining, coke, natural gas, peat, and petroleum industries).....	28
Columbium.....	126	Fuel and electricity (Also under individual industries).....	33
Coniston plant.....	87, 132	Fuel oil.....	18
Conisaurum mine.....	50	Fuels (and other non-metals).....	136
Consolidated Copper and Sulphur Co. Ltd.....	54, 93	General review.....	211
Consolidated Mining and Smelting Co. of Canada, Ltd.....	61, 63, 64, 65, 77, 81, 108, 133	Fullers earth.....	
Copper.....	93		
Consumption.....	96	G	
Exports.....	97	Garnets.....	161
Imports.....	96	Gasoline.....	33, 155
Method of computing value.....	237	Gaspé.....	63
Prices.....	98	General Review.....	5
Production.....	95	Glauber's salt.....	205
World production.....	98	Goderich Salt Co., Ltd.....	184
		Gold.....	36
		Alberta.....	38, 40, 44
		British Columbia.....	38, 40, 44
		Canada.....	38, 40
		Composition of Canadian gold reserves.....	42
		Exports.....	39

INDEX—Continued

	PAGE		PAGE
Held by Canadian Minister of Finance.....	41	K	
Imports.....	38	Kainite.....	201
Manitoba.....	38, 40	Kaolin.....	219
Method of computing value.....	237	Keno Hill.....	66
Nova Scotia.....	38, 40, 44	Kerosene.....	33
Ontario.....	38, 40, 41	Kingdon mine.....	63
Quebec.....	38, 40, 44	Kirkland Lake area.....	48, 49
Receipts at the Royal Mint.....	39	Klondike river district.....	43, 44
Standard.....	37		
Sources.....	36	L	
World production.....	42, 43	Lake Shore mine.....	49
Value of gold in Canadian funds.....	39	Land plaster (See Gypsum).....	
Yukon.....	38, 40, 44	Lead (See silver-lead-zinc mining).....	77
Gold Mining Industry.....	36	Consumption.....	78, 79
Alluvial gold mining.....	43	Exports.....	79
Auriferous quartz mining.....	46	Imports.....	79
Copper-gold-silver mining.....	54	Method of computing value.....	237
Costs.....	48	Prices.....	12, 80
Gowganda.....	60, 62	Production.....	78
Granada gold mine.....	47	Refined lead produced in Canada.....	79
Granby Consolidated Mining, Smelting and Power Co.....	57, 94, 134	World production.....	80
Granite.....	231	Lime.....	221
Graphite, natural (See miscellaneous non-metals)	194	Capital.....	22, 221
Exports.....	195	Employment.....	22, 25, 222
Imports.....	195	Exports.....	223
Production.....	194	Fuel and electricity.....	22, 28
World production.....	195	Imports.....	223
Granada mine.....	47	Power employed.....	35
Great Bear Lake.....	65, 124	Principal statistics.....	22
Green Stabell mine.....	47	Production.....	222
Grinding pebbles.....	161	Wage-earners.....	26
Grindstones.....	161	Limestone.....	231
Production.....	162	Production.....	231
Gypsum.....	20, 172	List of publications..... (inside front and back covers)	
Capital.....	20, 175	Lithium minerals.....	120, 195
Employment.....	20, 24, 175	Lubricating oil.....	158
Fuel and electricity.....	20, 28		
Number of mines.....	20	M	
Power employed.....	35	Mackenzie district.....	65
Principal statistics.....	20	Macassa mines.....	49
Production.....	176	Madoc district.....	193
Wage-earners.....	26, 175	Magnesite.....	196
World production.....	177	Exports.....	196
Gypsum Lime and Alabastine Co., Ltd.....	173	Imports.....	196
Gypsite.....	174	Production.....	196
		World production.....	197
H		Magnesium.....	120
Haydite.....	212	Magnesium sulphate.....	165, 197
Helen mine.....	113	Malagash mine.....	183
Holbrook Dredging Co.....	45	Manganese.....	121
Hollinger mine.....	47, 48	Production.....	121
Horne mine.....	55, 93	World production.....	122
Howey mine.....	50	Manganese bog.....	198
Hudson Bay Mining and Smelting Co., Ltd.....	56, 81, 93, 109, 133	Manitoba.....	15
		Capital.....	23
I		Employment.....	23
Ilmenite.....	128	Fuel and electricity.....	23, 32
Imported clay products industry.....	220	Number of plants.....	23
Capital.....	220	Power employed.....	34
Employment.....	221	Principal statistics.....	23
Imports and exports.....	215	Production.....	7, 15
International Nickel Co. of Canada, Ltd.....	56, 87, 94, 99, 132	Review.....	50, 56
Iodine.....	184	Wage-earners.....	26
Iridium.....	87, 101	Manufactures based chiefly on minerals (list of publications).....	Inside back cover
Iron ore.....	112	Marble.....	232
Exports.....	113	Marl.....	230
Imports.....	113	Mattagami clay.....	212
Shipments.....	118	Mayo district.....	61
World production.....	114	McIntyre mine.....	47
Iron oxides (ochre).....	20, 177	McLeod River Mining Corporation.....	51
Capital.....	20, 178	Mercury.....	122
Consumption.....	178	Imports.....	123
Employment.....	20, 24, 178	Production.....	122
Exports.....	179	World production.....	123
Fuel and electricity.....	20, 28	Metal mining industry.....	17
Imports.....	179	Metal prices.....	12
Number of mines.....	20	Metals—General review.....	5
Power employed.....	35	Methods of computing values (Appendix I).....	236
Principal statistics.....	20	Mica.....	20, 179
Production.....	179	Capital.....	20, 181
Wage-earners.....	26	Employment.....	20, 24, 181
Island Lake area.....	50	Exports.....	182
		Fuel and electricity.....	20, 28
		Imports.....	181, 182
		Number of mines.....	20
		Power employed.....	35
		Principal statistics.....	20

INDEX—Concluded

270

INDEX—Continued

	PAGE
Platinum group metals.....	87, 99
Exports.....	101
Imports.....	101
Method of computing value.....	237
Platinum metals consumed in the United States.....	101
Prices.....	12
Production.....	100
World production.....	102
Porcelain insulators.....	220
Porcupine area.....	47, 48
Port Colborne.....	132
Potash.....	184, 200
Pottery.....	218
Production from domestic clays.....	212
Poultry grit.....	233
Power employed (Also see under individual industries).....	34
Premier mine.....	46, 51
Prices (Also see under individual metals).....	11, 12
Principal statistics, by industries.....	17
Provinces—Review.....	6
Publications, list of.....	
Mineral industry.....	Inside front cover
Manufactures based chiefly on minerals. Inside back cover.....	
Pulps.....	161
Pumice.....	161
Pyrites.....	202
Exports.....	203
Imports.....	203
Production.....	203
Q	
Quartz (Also see under Feldspar and Quartz).....	170
Quebec.....	14
Capital.....	23
Employment.....	23
Fuel and electricity.....	23, 32
Number of plants.....	23
Power employed.....	34
Principal statistics.....	23
Production.....	7, 14
Review.....	47, 54
Wage-earners.....	26
Queensland.....	43
R	
Radium.....	5, 124, 133
Red Lake district.....	50
Refractories.....	219
Reno gold mine.....	51
Rhodium.....	87, 101
Rock wool.....	230
Rockingham ware.....	220
Roofing tile.....	215
Rossland.....	57, 133
Rouyn district.....	47
Royal Mint.....	37
Rubble and riprap.....	233
Ruthenium.....	101
Rutile.....	128
S	
Salt soda.....	205
Salaries and wages (Also under individual industries).....	24
Salt.....	183
Capital.....	20, 185
Consumption.....	186
Employment.....	20, 24
Exports.....	186
Fuel and electricity.....	20, 28
Imports.....	186
Power employed.....	35
Principal statistics.....	20
Production.....	185, 186
Wage-earners.....	26, 185
World production.....	187
Salt cake.....	205
San Antonio mine.....	50
Sand-lime brick.....	228
Sand and gravel.....	223
Capital.....	22, 225
Employment.....	22, 225
Fuel and electricity.....	22, 28
Imports and exports.....	226
Power employed.....	35
Principal statistics.....	22
Production.....	225
Wage-earners.....	26

	PAGE
Sandstone.....	231
Production.....	231
Sanitaryware.....	220
Saskatchewan.....	16
Capital.....	23
Employment.....	23
Fuel and electricity.....	23, 32
Number of plants.....	23
Power employed.....	34
Principal statistics.....	34
Production.....	7, 16
Review.....	51, 57
Wage-earners.....	26
Scheelite.....	121
Selenium.....	93, 128
Sewer pipe.....	218
Shawinigan Falls.....	131
Sharpening stones.....	161
Silex.....	171
Silica.....	172
Silica brick.....	170, 205
Silica sand.....	170, 172
Silver.....	60, 71
Commercial ratio.....	74
Exports.....	75
Consumption.....	72, 76
Imports.....	75
Legislation.....	71
Method of computing value.....	237
Monetary stocks.....	77
Prices.....	12, 73, 74
Production.....	73, 74
Review.....	60
Sources.....	61, 74
World production.....	75
Silver-cobalt mining.....	18, 62
Capital.....	18, 63
Employment.....	18, 24, 63
Fuel and electricity.....	18, 28
Number of plants.....	18, 62
Power employed.....	34
Principal statistics.....	18
Shipments of ores, etc.....	18, 62
Wage-earners.....	26
Silver Islet mine.....	60
Silver-lead-zinc mining.....	18, 63
Capital.....	18, 67
Employment.....	18, 24, 68
Fuel and electricity.....	18, 28
Number of plants.....	18
Ores mined and milled.....	66
Power employed.....	34
Principal statistics.....	18
Products shipped.....	67
Shipments.....	18, 66
Wage-earners.....	26, 68
Silver mining, including exports, imports, prices, production, and world output of arsenic, cobalt, lead, silver and zinc.....	60
Siscon mine.....	47
Slate.....	228
Soapstone.....	188
Soda ash.....	205
Sodium carbonate.....	205
Production.....	205
Sodium sulphate.....	205
Imports.....	206
Production.....	206
South Lorraine.....	60
Steel and rolled products (See pig iron, steel and rolled products).....	115
Stibnite.....	106
Stone, including data on granite, limestone, marble and sandstone.....	229
Capital.....	22, 230
Employment.....	22, 25, 231
Exports.....	235
Fuel and electricity.....	22, 28
Imports.....	235
Power employed.....	35
Principal statistics.....	22
Production.....	231, 232
Wage-earners.....	26, 231
Stoneware and pottery.....	218, 220
Principal statistics.....	21
Structural tile.....	215
Sudbury area.....	113
Sullivan mine.....	63, 65, 81
Sulphur.....	202
Sulphuric acid.....	158, 204

INDEX—Concluded

	PAGE		PAGE
T		World production of minerals—con.	
Talc and soapstone.....	188	Coal.....	143
Capital.....	20, 189	Cobalt.....	71
Consumption.....	190	Copper.....	98
Employment.....	20, 24, 189	Cyrolite.....	106
Exports.....	190	Diatomaceous earth.....	160
Fuel and electricity.....	20, 28	Feldspar.....	170
Imports.....	190	Gold.....	42, 43
Number of mines.....	20	Graphite.....	195
Power employed.....	35	Gypsum.....	177
Principal statistics.....	20	Iron and steel, steel ingots and castings.....	120
Production.....	190	Iron ore.....	114
Wage-earners.....	26	Lead.....	81
World production.....	190	Magnesite.....	197
Tantalum.....	126	Manganese.....	122
Teck-Hughes mine.....	49	Mercury.....	123
Tellurium.....	93, 126	Mica.....	183
Temiskaming district.....	60	Molybdenum.....	124
Tetreault mine.....	63	Nickel ore.....	92
Thetford district.....	164	Petroleum.....	156
Tile, drain.....	218	Phosphate.....	200
Tin.....	126	Pig iron.....	119
Consumption.....	127	Platinum.....	102
Imports.....	127	Potash minerals.....	201
Prices.....	126	Pyrites.....	203
World production.....	127	Radium.....	125
Titanium ore.....	128	Salt.....	187
Trail smelter.....	77, 133	Silver.....	75, 76
Trap Rock (See Granite)		Steel ingots.....	120
Treadwell Yukon Co. Ltd.....	66, 77	Sulphur.....	204
Tripolite (See volcanic ash).....	160	Talc and soapstone.....	190
Tungsten.....	129	Tin.....	127
World production.....	129	Tungsten.....	129
Turner Valley.....	152	Uranium.....	125
		Vanadium.....	130
		Zinc.....	84
U		Wright-Hargreaves.....	49
Union Minière du Haut Katanga.....	70, 125		
Uranium.....	5, 124	Y	
V		Yukon.....	17
Vanadium.....	130	Capital.....	23
Volcanic dust.....	161	Employment.....	23
		Fuel and electricity.....	23, 32
W		Number of plants.....	23
Wabana mine shipments.....	113	Power employed.....	34
Wage-earners.....	24	Principal statistics.....	23
Wainwright field.....	152	Production.....	7, 17
Waite-Amulet mine.....	55	Review.....	52, 66
Wax.....	155	Wage-earners.....	26
Whiting.....	233	Yukon Consolidated Gold Corp. Ltd.....	45
World production of minerals.....		Z	
Aluminium.....	105	Zinc.....	81
Antimony.....	107	Consumption.....	82, 83
Arsenic ore and white arsenic.....	69	Exports.....	83
Asbestos.....	168	Imports.....	83
Bauxite.....	106	Method of computing value.....	237
Bismuth.....	109	Prices.....	81, 84
Cadmium.....	110	Production.....	82
China clay.....	220	Refined zinc produced in Canada.....	83
Chrome ore.....	112	World production (See also silver-lead-zinc mining).....	84

LIST OF PUBLICATIONS

PREPARED IN THE

MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

STATISTICS OF MANUFACTURES—based chiefly on minerals.

General reports on the sections of manufactures covered by the Mining, Metallurgical and Chemical Branch are issued as follows:—

Printed Reports—

Iron and Steel and Their Products: Pig Iron and Ferro-Alloys—Steel and Rolled Products—Castings and Forgings—Boilers, Tanks and Engines—Agricultural Implements—Machinery—Automobiles—Auto Accessories—Bicycles—Railway Rolling Stock—Wire and Wire Goods—Sheet Metal Products—Hardware, Tools and Cutlery—Bridge Building and Structural Steel—Miscellaneous Iron and Steel Products.

Manufactures of Non-Ferrous Metals: Aluminium Products—Brass and Copper Products—Lead, Tin and Zinc Products—Jewellery and Silverware—Electrical Apparatus and Supplies—Miscellaneous Non-Ferrous Metal Products—Non-Ferrous Smelting and Refining.

Manufactures of Non-Metallic Minerals: Aerated Waters—Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Dressed Stone—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Non-Metallic Mineral Products, n.e.s.

Chemicals and Allied Products: Coal Tar Distillation—Acids, Alkalies and Salts—Compressed Gases—Explosives, Ammunition and Fireworks—Fertilizers—Medicinal and Pharmaceutical Preparations—Paints, Pigments and Varnishes—Soaps, Cleaning Preparations and Washing Compounds—Toilet Preparations—Inks—Adhesives—Polishes and Dressings—Wood Distillation—Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.

Annual Bulletins.—In addition to the foregoing printed reports, a series of bulletins is issued annually, each of which presents the principal statistics relative to production: (a) in a particular industry, e.g., Automobiles—Petroleum Products, etc., (b) in each of the four main groups of industries. These are published in mimeograph form from time to time during the year as the necessary material becomes available.

Quarterly—

Production and Sales of Radio Receiving Sets.
Production and Imports of Galvanized Sheets.
Sales of Electric Storage Batteries.

Monthly—

Production of Pig Iron and Steel in Canada.
Coal and Coke Statistics for Canada.
Automobile Statistics for Canada.

SPECIAL REPORTS—

Directory of Chemical Industries in Canada, as of July 1, 1932.
Consumption of Chemicals in Municipal Waterworks, 1931 and 1932.
The Fertilizer Trade in Canada (annual).

SEE INSIDE FRONT COVER FOR PUBLICATIONS ON THE MINERAL INDUSTRY

6-D-28

CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR

1934

Published by Authority of the Hon. W. D. Euler, M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1936

Price, 50 cents

LIST OF PUBLICATIONS

PREPARED IN THE

MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

MINERAL PRODUCTION (Mining and Metallurgy).

General Reports—

Preliminary Reports (semi-annual) on the Mineral Production of Canada.

Monthly Reports on Canada's Leading Mineral Products.

Annual Report on the Mineral Production of Canada. (In one volume.) Price 50 cts.

A comprehensive record of the mining industry embodying historical and world data, detailed information on mineral production, imports and exports for Canada and general statistics relative to the mining industry on capital investment, employment, fuel consumption and power equipment, arranged in 9 chapters, each dealing with a particular branch of the industry. Statistics on production and trade in mineral products appear in detail in the appropriate chapters. Fully indexed. Chapter titles are: Canada—The Gold Mining Industry—The Silver Mining Industry—The Nickel-Copper Industry—Miscellaneous Metal Mining Industries—The Non-Ferrous Smelting and Refining Industry—The Coal Mining Coke, Natural Gas, Peat and Petroleum Industries—Non-Metal Mining Industries (Other than Fuels)—The Clay Products and Other Structural Materials Industries—Notes on the Methods of Computing Values—Directory—Index.

Coal—

Monthly and Quarterly Reports on Coal and Coke Statistics for Canada.

A condensed report on production, imports and exports of coal and coke is issued monthly, publication being made about the twentieth of the next following month.

A more general review is published quarterly, showing statistics for each month, for the quarter, and for the year to date on the output by coal-mining districts and by provinces, imports and exports by ports and by kinds of coal, employment in coal mining, and tonnage lost. There is also a section on coke showing production, imports, exports, distribution and consumption by months and by provincial groups.

Annual Report on Coal Statistics for Canada. Price 25 cents.

Text and tables showing for Canada, and for each of the coal-producing provinces, historical and current data on output, tonnage lost, disposition of coal from the mines, domestic and foreign shipments, exports and imports by ports, consumption of coal, prices, employment, salaries and wages paid, power equipment, capital investment, etc.

ANNUAL BULLETINS—

Metals—The Gold Mining Industry in Canada, which includes Alluvial Gold Mining, Auriferous Quartz Mining, Copper-Gold-Silver Mining, and tables showing Canadian and world production of Gold.—The Silver Mining Industry in Canada, which includes Silver-Cobalt-Arsenic Mining, Silver-Lead-Zinc Mining and tables showing Canadian and world production of Arsenic, Cobalt, Lead, Silver and Zinc.—The Nickel-Copper Mining, Smelting and Refining Industry, which includes Canadian and world production of Nickel.—The Canadian and World Production of Copper.—Metals of the Platinum Group.—The Production of Miscellaneous Metals, including Antimony, Beryl, Bismuth, Cadmium, Chromite, Lithium, Manganese, Mercury, Molybdenite, Radium, Selenium, Tin, Titanium, Tungsten.—The Non-Ferrous Smelting and Refining Industry.

Non-Metals.—Abrasives—Asbestos—Coal—Feldspar—Gypsum—Iron Oxides—Mica—Natural Gas—Petroleum—Quartz—Salt—Talc and Soapstone—Miscellaneous Non-Metallic Minerals, including Actinolite, Barytes, Bituminous Sands, Fluorspar, Graphite, Magnesite Dolomite, Bog Manganese, Natural Mineral Waters, Phosphate, Silica Brick, Sodium Carbonate, Sodium Sulphate, Sulphur (Pyrites).

Structural Materials.—Cement—Clay and Clay Products—Lime—Sand and Gravel—Stone.

SEE INSIDE BACK COVER FOR PUBLICATIONS ON MANUFACTURES BASED CHIEFLY ON MINERALS

CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA
DURING THE CALENDAR YEAR
1934

Published by Authority of the Hon. W. D. Euler, M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1936

NOTES ON STATISTICS OF PRODUCTION

In the collection of production data, the Dominion Bureau of Statistics makes a division between primary and secondary production. In the first-named class, there are separate sections for the collection of statistics on (a) **Agricultural Products**, (b) **Furs**, (c) **Fish**, (d) **Forest Products**, (e) **Mineral Products**.

In the second are included (a) **Manufacturing** and (b) **Construction**.

Manufacturing is subdivided into nine groups of industries, producing concerns being classified according to the principal component material of their major products. For example, manufactures of leather goods are classified under "Animal Products"; the pulp and paper industry under "Wood and Paper," etc. An outline of the scheme of classification in use for manufacturing industries is given below:

Manufactures of—

- (1) **Vegetable Products**, including—Coffee and Spices; Cocoa and Chocolate; Preserved and Canned Products; Pickles, Vinegar and Cider; Flour and Cereals; Bread and other Bakery Products; Macaroni and Vermicelli; Distilled and Brewed Liquors and Wines; Rubber Products; Starch and Glucose; Sugar, Tobacco Products; Linseed Oil and Oil Cake.
- (2) **Animal Products**, including—Fish and Fish Products; Dairy Factory Products; Meat and Meat Products; Leather and Leather Products; Furs and Fur Products.
- (3) **Textiles and Textile Products**, including—Cotton Textiles (Cloth, Yarn, Thread and Waste); Woollen Textiles (Cloth, Yarn, Blankets, Felt, and Waste); Silk Products; Factory-Made Clothing; Carpets, Rugs and Mats; Cordage, Rope and Twine.
- (4) **Wood and Paper**, including—Pulp and Paper Mill Products; Paper Goods; Printing, Publishing and Lithographing; Saw and Planing Mill Products; Furniture; Carriages; Wagons and Sleighs; Wooden Containers; Woodenware; Turned Wood Products; and the Output of Similar Wood-Using Industries.
- (5) **Iron and Steel and Their Products**, including—Pig Iron and Ferro-Alloys; Steel and Rolled Products; Castings and Forgings; Boilers, Tanks and Engines; Farm Implements; Machinery; Automobiles; Auto Parts; Bicycles; Railway Rolling Stock; Wire and Wire Goods; Sheet Metal Products; Hardware, Tools and Cutlery; Bridge Building and Structural Steel Work; Miscellaneous Iron and Steel Products.
- (6) **Manufactures of Non-Ferrous Metal Products**, including—Aluminium Products; Brass and Copper Products; White Metal Alloys; Jewellery and Silverware; Electrical Apparatus and Supplies; Non-Ferrous Smelting and Refining; Miscellaneous Non-Ferrous Metal Products.
- (7) **Manufactures of the Non-Metallic Minerals**, including—Aerated Waters—Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Dressed Stone—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Miscellaneous Non-Metallic Mineral Products, n.e.s.
- (8) **Chemicals and Allied Products**, including Coal Tar Distillation; Acids, Alkalies, and Salts—Compressed Gases; Explosives, Ammunition and Fireworks; Fertilizers; Medicinal and Pharmaceutical Preparations; Paints, Pigments and Varnishes; Soaps, Cleaning Preparations and Washing Compounds—Toilet Preparations; Inks; Adhesives; Polishes and Dressings; Wood Distillation; Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.
- (9) **Miscellaneous Products**, including—Brooms and Brushes; Electric Light and Power; Musical Instruments, etc.

The statistics of manufactures are also classified according to the **use or purpose** of the end product as follows:—

- (1) **Food**, including—Breadstuffs; Fish; Nuts; Fruits and Vegetables; Meats, Milk Products; Oils and Fats; Sugar; Infusions; Miscellaneous.
- (2) **Drink and Tobacco**, including—Beverages, alcoholic; Beverages, non-alcoholic; Tobacco.
- (3) **Clothing**, including—Boots and Shoes; Fur Goods; Garments and Personal Furnishings; Gloves and Mitts; Hats and Caps; Knitted Goods; Waterproofs; Miscellaneous.
- (4) **Personal Utilities**, including—Jewellery and Time-Pieces; Recreational Supplies; Personal Utilities, n.e.s.
- (5) **House Furnishings**.
- (6) **Books and Stationery**.
- (7) **Vehicles and Vessels**.
- (8) **Producers' Materials**, including—Farm Materials; Manufacturers' Materials; Building Materials; General Materials.
- (9) **Industrial Equipment**, including—Farm Equipment; Manufacturing Equipment; Trading Equipment; Service Equipment; Light, Heat and Power Equipment; General Equipment.
- (10) **Miscellaneous**.

PREFACE

This report on the Mineral Production of Canada is issued in continuance of the series of annual reports published first by the Geological Survey of Canada in 1886, later by the Mines Branch of the Department of Mines, and since 1921 by the Dominion Bureau of Statistics. It contains final data on the production of Canada's mines, together with details of capital employed in the mining industry, salaries and wages paid, the number of employees, the amount expended on fuel and power and the power producing equipment installed.

Tables of world production of the more important minerals and metals are included for the purpose of assisting those who may be making international studies and who may not have a reference library readily at hand.

Prior to 1931 it had always been the practice of the Bureau to evaluate gold at the standard price of \$20.671834 per fine ounce regardless of what might be defined as the normal fluctuations of foreign exchange. However, during the past four years, international events of great importance have resulted in a very pronounced increase in the price of gold. This price appears, at the present time, to have attained a temporary stability. For this reason the value of gold in this report, shown either separately or incorporated in the total value of Canadian mineral production, has been computed in Canadian funds. This new statistical procedure in the recording of gold values should be noted in making comparisons with corresponding data published in earlier reports.

In addition to this report the Bureau issues a preliminary report of mineral production about March 15th following the year to which it refers. Since the fuel problem is of major importance to Canada, a separate annual report and quarterly reports on coal statistics are published. Statistical bulletins on the production of Canada's principal minerals are issued monthly, and bulletins on various branches of the mining industry are published as the information becomes available.

As in former years, the Bureau has continued to co-operate with the provinces of Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia in the collection of coal statistics.

By arrangement, the Bureau and the Mines Departments of the provinces of Quebec, Ontario, Manitoba and British Columbia use joint forms in the collection of mineral statistics. This system is of considerable advantage to the operator, as he now has to file only one form in duplicate, and it also tends to greater comparability in Dominion and Provincial figures.

The cordial thanks of the Bureau are tendered to mine and smelter operators, to the Department of the Interior, to the Federal Department of Mines, to the Royal Canadian Mint and to the Imperial Institute, London, for assistance given and information made available. The railway and other transportation companies, as well as smelter operators outside of Canada, have also furnished data, the receipt of which is gratefully acknowledged.

This report has been prepared under the direction of Mr. W. H. Losee, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., and Mr. B. R. Hayden, of the mineral division staff.

R. H. COATS,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS,
OTTAWA, January 28, 1935.

TABLE OF CONTENTS

	PAGE
CHAPTER ONE—CANADA—General review.....	5
CHAPTER TWO—The Gold Mining Industry, including (a) The Alluvial Gold Mining Industry, (b) The Auriferous Quartz Mining Industry, and (c) The Copper-Gold-Silver Mining Industry and commodity statistics showing production, imports, exports and world output of <i>Gold</i>	40
CHAPTER THREE—The Silver Mining Industry, including (a) The Silver-Cobalt Mining Industry, (b) The Silver-Lead-Zinc Mining Industry, and commodity statistics, showing production, imports, exports, prices and world output of <i>Arsenic, Cobalt Silver, Lead, and Zinc</i>	70
CHAPTER FOUR—The Nickel-Copper Mining, Smelting and Refining Industry, including commodity statistics showing production, imports, exports, prices and world production of <i>Nickel, Copper, and Metals of the Platinum Group</i>	96
CHAPTER FIVE—Miscellaneous Metal Mining Industries, including commodity statistics showing production, imports, exports, prices and world production of <i>Aluminium, Antimony, Bauxite, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron, Steel and Rolled Products, Manganese, Mercury, Molybdenum, Radium, Tin, Tungsten and Vanadium</i>	112
CHAPTER SIX—The Non-Ferrous Smelting and Refining Industry.....	143
CHAPTER SEVEN—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries (Fuels), including commodity statistics showing production, imports, exports, prices and world production of <i>Coal, Coke, Natural Gas, Peat and Crude Petroleum</i> ...	150
CHAPTER EIGHT—Non-Metal Mining Industries (excluding Fuels), including commodity statistics showing production, imports, exports, prices and world output of <i>Abrasives, Asbestos, Feldspar, Gypsum, Iron Oxides, Mica, Quartz, Salt, Talc and Soapstone</i> , and Miscellaneous Non-Metallic Minerals, including: <i>Actinolite, Barytes, Bituminous Sands, Graphite, Fluorspar, Lithium Minerals, Magnesitic dolomite, Magnesium Sulphate, Natural Mineral Waters, Natro-Alunite, Phosphate, Pyrites, Silica Brick, Sodium Carbonate and Sodium Sulphate</i>	173
CHAPTER NINE—The Clay Products and Other Structural Materials Industries, including commodity statistics showing production, imports and exports of <i>Cement, Clay and Clay Products</i> —(a) From Domestic Clays: <i>Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Sanitary Ware and Pottery, Fireclay, Firebrick, Fireclay Blocks and Shapes</i> ; (b) From Imported Clays: <i>Ceramic or Glazed Floor and Wall Tile, Electrical Porcelain Insulators, Sanitary Ware and Pottery, Fireclay Blocks and Shapes, Lime, Sand and Gravel, Sand-Lime Brick, Slate, and Stone</i>	231
APPENDIX—Explanatory notes on the methods of computing values shown in reports on the mineral production of Canada.....	264
DIRECTORY—List showing the names, head offices and mine or plant addresses of all concerns operating in the mineral industry in Canada, arranged in alphabetical order, by industries and by provinces.....	266
INDEX.....	297

DOMINION BUREAU OF STATISTICS

R. H. COATS, LL.D., F.R.S.C., F.S.S. (Hon.), Dominion Statistician
W. H. LOSEE, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1934

CHAPTER ONE

General Review.—The year 1934 witnessed a distinct improvement in the Canadian mining industry; the value of the Dominion's mineral output for the twelve months totalled \$278,162,000 as compared with \$221,496,000 in 1933, or an increase of 25·6 per cent. Increases in value over the preceding year were recorded for each of the principal groups in the industry and included metals, fuels, clay products, structural materials and various other non-metallic minerals. The annual survey of mining operations in 1934 was particularly interesting in that several all-time high records were established in metal production and returns from the industry indicated a strong upward trend in employment, the monthly index increasing from 106·8 in January to 122·9 in December, the average for the year being 110·8 as compared with 97·5 for 1933.

Comprehensive data relating to mining in Canada were first collected in 1886 and progress in the industry since that time not only forms an important and interesting chapter in the history of the Canadian industry, but has established the Dominion in a position of world prominence as a producer of mineral wealth. In 1886 Canadian mineral production was evaluated at \$10,221,255 or \$2·23 per capita; a decade ago, in 1924, the total value had reached \$209,583,406 and by 1929 the all-time high records of \$310,850,246 and \$31·00 per capita were attained. Production in this latter year was followed by the world economic depression, with successive declines in the value of mineral output to \$191,228,225 in 1932. The 1934 production, representing a per capita value of \$25·67, is the second successive increase since 1932 and not only indicates the stability of this basic industry but emphasizes the ever-increasing status of Canadian mineral resources in the economic life of the nation.

The more important mineral products in 1934, in the order of their production value were: gold, coal, nickel, copper, zinc, natural gas, silver, platinum metals, cement, asbestos, stone, sand and gravel, petroleum, lime, clay products and salt. This list of sixteen products includes all that are \$1,000,000 or over in value and in the aggregate they comprise 95·2 per cent of the total recorded value of Canadian mineral production. In addition to these more important products, some 32 other minerals and metals were produced, including arsenic, bismuth, cadmium, radium and uranium, selenium, gypsum, graphite, mica, feldspar and several other metallic and non-metallic mine products.

Of the major mineral groups, metals continued to retain a predominant position in Canadian mineral production; the value of these in 1934 totalled \$194,110,968 or 69·8 per cent of the total mineral output. The value of gold production totalled \$102,536,553 in Canadian funds and constituted an all-time high record for the gold producing mines of Canada. The increase of approximately 67 per cent in the price of this precious metal since 1930 has been largely responsible for the almost continuous expansion in gold mining during recent years. Prospecting of areas considered as favourable for gold deposition and development and exploration of auriferous deposits were intensified in 1934 and several new gold properties brought into production. Of the total value of metal production during the year that of lead comprised approximately 4·35 per cent; zinc, 4·70 per cent; and silver, 4 per cent. The year under review saw a distinct

improvement in lead-zinc-silver production with the output of the first two metals being the highest ever recorded in the history of the Canadian mining industry. Silver production for the year realized an 8.1 per cent gain over 1933 and its value at \$7,790,840 reflects the 25.5 per cent increase in the price per ounce of fine silver over that for the preceding year. Copper output in 1934 at 364,761,062 pounds was the highest ever attained in the Dominion; the total value of production, however, as with lead and zinc, reflected the relatively low prices prevailing for base metals throughout the year. The 1934 production of nickel included the metal contained in matte exported, electrolytic nickel made at Port Colborne, Ontario, and nickel in oxides and salts produced in Canadian plants; the 1934 output of nickel was the highest on record, surpassing 1929, the previous high year, by 17 per cent. Of the total value of all metals produced in the Dominion throughout 1934, the value of nickel comprised 16.58 per cent, being surpassed only by that of gold. Canadian mineral deposits yielded, in 1934, 200,162 fine ounces of platinum, palladium and other platinum group metals evaluated at \$6,190,045; these figures represent an increase over the preceding year of 258.7 per cent in quantity and 312 per cent in value and constitute an **all-time** high record for the production of these metals in Canada.

The almost general recovery experienced throughout the industry in 1934 was reflected in an increase in the total value of production of the non-metallic minerals and structural materials. The value of fuels increased from \$47,778,436 in 1933 to \$54,262,099 in 1934, with increases in value recorded for coal, natural gas, peat and petroleum. Coal production in Canada during 1934 advanced to 13,810,193 tons worth \$42,045,942 from the 1933 total of 11,903,344 tons valued at \$35,923,962. The 1934 output included 10,058,782 tons of bituminous coal, 537,508 tons of sub-bituminous, and 3,213,903 tons of lignite. Imports of coal into Canada in 1934 reached a total of 13,813,657 tons as compared with 11,465,976 tons imported in the preceding year. Anthracite coal imported in 1934 totalled 3,537,309 tons, of which Great Britain supplied 1,643,516 tons; the United States, 1,804,127 tons; Germany, 72,103 tons; Belgium, 17,557 tons, and Newfoundland, 6 tons. The continued assistance given by the Dominion Government was, to a large extent, responsible for the increased sales of Canadian coal in these highly competitive Canadian markets. During the year under review 2,368,803 short tons of Canadian coal were moved under Dominion Government assistance as compared with 1,932,711 tons in 1933. The Canadian consumption of fuel oil in 1934 totalled 400.7 million gallons and of gas oils, 102.3 million imperial gallons; in 1933 fuel oil consumption amounted to 389.8 million gallons and gas oils, 91.9 million imperial gallons. Production of crude petroleum in 1934 totalled 1,410,895 barrels valued at \$3,449,162 as against 1,145,333 barrels worth \$3,138,791 in 1933.

The improvement in those industries producing talc, diatomite and various other non-metallic minerals, other than fuels, and structural materials, while not so pronounced as for some of the other major groups, was distinct; relatively slight declines in value recorded for asbestos and various other minerals in this classification were more than offset by increases realized for such important products as salt, gypsum, graphite and feldspar. The value of clay products, comprising the various types of brick, sewer pipe, clays, etc., totalled \$2,680,410 as compared with \$2,262,835 in 1933; this increase, although modest, is encouraging in that it signifies a definite advance in the ceramic industries. Production by that group of industries producing cement, lime, sand and gravel and stone was valued at \$16,606,351 in 1934 as compared with \$14,433,852 for the preceding year; the combined value of output by these producers had suffered successive decreases from a total of \$44,630,191 in 1929 and the improvement in 1934 would suggest a widespread revival in construction and building activities.

Ontario continued as the premier mineral producing province of the Dominion. In 1934 the value of minerals produced in this province totalled \$145,565,871 or 52.3 per cent of the total Canadian output; British Columbia occupied second position with a production valued at \$41,206,965, and the other provinces and territories, in the order of their production, ranked as follows: Quebec, Nova Scotia, Alberta, Manitoba, Saskatchewan, New Brunswick, Yukon and Northwest Territories. It is particularly interesting to note a considerable increase in prospecting and exploration of mineral-bearing areas in Saskatchewan and the Northwest Territories; these activities resulted in 1934 in the partial development of certain gold-bearing deposits that are now considered of possible economic importance.

The complete statistical survey of the entire Canadian mining industry established the fact that operating mines, smelters, refineries, oil and gas fields, clay products plants, cement mills, sand and gravel properties, and stone quarries represented a total capital investment of \$831,023,187

in 1934. The survey conducted by the Bureau covered the operations of 11,652 mines, quarries, smelters, etc. Returns made by the industry show that 73,505 persons were employed in the various spheres of mining, an increase of 16.1 per cent over 1933; employees in 1934 received a total of \$88,126,186 in salaries and wages compared with \$70,031,805 in 1933 and \$71,772,049 in 1932. Net sales of mineral products amounted to \$266,652,847. This value is 20.4 per cent in excess of 1933 and represents the proceeds from sales and includes the value added by smelting operations. It is emphasized that this figure should not be confused by comparison with the value of Canadian mineral production for 1934 as shown in table 2, which figure, amounting to \$278,161,590, includes the value of the metals computed at average prices in a recognized world market, together with the reported value of sales of non-metals and structural materials.

Producers of primary base metals in 1934 continued to experience exceptionally low prices for their products. Transposed into Canadian funds the average price of copper based on the London market was 7.4548 cents per pound in 1933 and 7.4193 cents in 1934; the average price of lead based on the same market was 2.3916 cents per pound in 1933 and 2.4364 cents in 1934; the average price of zinc in Canadian funds based on the London market was 3.2105 cents per pound in 1933 and in 1934, 3.0436 cents per pound. The low level of base metal prices was partially compensated for by increases in those of various precious metals. The average world market price of an ounce of fine gold, expressed in Canadian funds, was computed at \$34.50 in 1934 as compared with \$28.60 in the preceding year and \$20.67 the standard price in 1930. The average price of silver in Canadian funds based on the New York market was 37.8328 cents per fine ounce in 1933 and in 1934 it had increased to 47.4609 cents, the highest value for the metal since 1929.

The almost general improvement in the mining industry was strongly reflected in the foreign trade returns relating to the export of Canadian mine products; the value of exports of the non-ferrous metals and their products were evaluated at \$93,677,123 in 1934 as compared with \$69,340,625 in the preceding year, or an advance of 35.1 per cent. Some of the more outstanding increases in exports under this classification included a 27.1 per cent gain for aluminium and its products; 37.8 per cent for copper and its products; 10.7 per cent for lead and its products; 26.8 per cent for nickel and its products; 343.8 per cent for primary platinum; 31.2 per cent for silver bullion; 48.7 per cent for zinc and its products, and 62.5 per cent for gold bullion. The penetration of Canadian mine products into the various markets of the world is better appreciated in a study of the destinations of exports as recorded by the Department of National Revenue. In 1934 destination of Canadian copper and its products included the United Kingdom, France, Germany, Belgium, Denmark, British India, Italy, Japan, Brazil, Argentina, Australia and New Zealand, and it is noteworthy that of the total value of the 1934 copper exports, \$14,969,009 or 64.2 per cent went to the United Kingdom and \$3,045,919 or 13.1 per cent to the United States, whereas in 1931 the corresponding exports to the United Kingdom were valued at only \$1,961,794 or 11.4 per cent of the total exports while those to the United States amounted to \$13,652,932 or 79.6 per cent. The United States continues to remain the greatest market for Canadian nickel, this country receiving in 1934 Canadian nickel or its products valued at \$12,080,198 or 41.8 per cent of the total Canadian nickel exports; the United Kingdom nickel imports from Canada amounted to \$10,087,351 in 1934, while the balance of Canadian nickel went to Germany, France, Italy, Japan, and various other countries. Of Canadian gold bullion exported in 1934, \$69,469,563 was shipped to the United States and \$21,545,438 to the United Kingdom, compared with \$40,804,715 to the United Kingdom and \$15,197,546 to the United States in 1933.

Exports of the non-metallic minerals and their products increased 18.4 per cent from a value of \$13,308,957 in 1933 to \$15,758,171 in 1934. In this group the value of asbestos and asbestos products exports increased from \$5,062,838 in 1933 to \$5,270,322 in 1934; shipments of this well-known Canadian mineral in 1934 went largely to the United States, Japan, Germany, United Kingdom, and France, with lesser quantities to various other countries; the value of exports of coal and its products totalled \$2,585,456 as compared with \$1,998,546 in the preceding year; graphite shipments to foreign countries showed an advance from \$40,115 in 1933 to \$90,129 in 1934, an increase of 124.7 per cent; improvement in industrial conditions, especially in the United States and the United Kingdom, was largely responsible for an increase in the value of Canadian mica exports from \$46,213 in 1933 to \$117,802 in 1934, or an increase of 154.9 per cent and the value of gypsum exports rose from \$344,085 in 1933 to \$413,961 for the year under review.

Legislation of great importance to the gold mining industry was enacted by the Canadian Federal Government in 1934 when the special war Revenue Act was amended in April to provide for a tax on newly mined Canadian gold. It was felt that the unusually prosperous condition of the gold mining industry, due to the rise in the price of gold from \$20.67 per ounce to about \$35.00 per ounce, provided a basis for this gold tax. In the budget speech of March, 22, 1935, the Minister of Finance stated that the gold bullion tax would not be continued after May 31, 1935, and that in future the allowance for depletion to mining companies, the principal product of which is gold or silver, is to be $33\frac{1}{3}$ per cent instead of 50 per cent. Furthermore, dividends received by shareholders are now to be taxed on the basis of a 20 per cent depletion allowance instead of 50 per cent as formerly. With the opening of the Bank of Canada on March 11, 1935, important changes took place in connection with the monetary gold reserves of the Dominion. The Dominion transferred the gold held against Dominion notes to the Bank of Canada to an amount of \$69,455,439. The Dominion's liability for Dominion notes outstanding was assumed by the Bank of Canada. Silver also held by the government was transferred to the Bank of Canada.

A statistical survey to determine the value of consumable stores and equipment purchased and expenditures for freight and insurance, by the Canadian mining and non-ferrous metallurgical industries was recently conducted by the Bureau of Statistics. This survey revealed that the total value of purchases by the industry in 1934, as computed from returns made available, amounted to \$76,083,000. The survey covered the major groups of the mining industry, including metal mining, smelting and refining of non-ferrous ores; non-metallic mineral mining, including coal, petroleum and natural gas production, and, to a lesser extent, the stone, lime and other structural materials industries.

Table 1.—Mineral Production of Canada, by Provinces, 1934 ⁽¹⁾

—	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	Yukon*	Canada
METALLICS										
Arsenic (As ₂ O ₃)										
lb.				1,647,513						1,647,513
\$				56,412						56,412
Bismuth.....lb.				7,552				246,092		253,644
\$				3,444				297,771		301,215
Cadmium.....\$								95,665		95,665
Chromite.....ton			71							111
\$			1,098	480						1,578
Cobalt.....lb.				594,671						594,671
\$				592,497						592,497
Copper.....lb.			73,968,545	205,059,539	30,867,141	6,618,913		48,246,924		364,761,062
\$			5,487,948	14,822,704	2,290,126	491,077		3,579,583		26,671,438
Gold.....fine oz.	3,525		390,097	2,105,339	132,321	5,405		296,196	38,798	2,972,074
\$	72,868		8,064,020	43,521,218	2,735,318	111,731	8,124	6,122,915	802,026	61,438,220
Estimated ex- change equi- valization on gold pro- duced.....\$	48,745		5,394,327	29,112,977	1,829,757	74,741	5,434	4,095,847	536,505	41,098,333
Lead.....lb.				21,558				344,467,138	1,786,880	346,275,576
\$				525				8,392,597	43,536	8,436,658
Nickel.....lb.				128,687,340						128,687,340
\$				32,139,425						32,139,425
Palladium, Rhodium, Iridium, etc.										
fine oz.				83,932						83,932
\$				1,699,282						1,699,282
Platinum .fine oz				116,177				53		116,230
\$				4,488,712				2,051		4,490,763
Radium and uranium (products) ..\$			(Data not available for publication)							
Selenium.....lb.			48,764	51,574	4,127	459				104,924
\$			73,146	91,286	6,190	689				171,311
Silver.....fine oz.	321		470,254	5,321,160	1,252,920	87,551	35	8,729,721	553,320	16,415,282
\$	152		223,187	2,525,470	594,647	41,552	17	4,143,204	262,611	7,790,840

* Includes silver, lead and petroleum produced in the Northwest Territories.

¹ Unless otherwise noted all total values of mineral production from 1931 to 1934, inclusive, include estimated exchange equalization on gold produced.

Table 1.—Mineral Production of Canada, by Provinces, 1934—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	Yukon	Canada
METALLICS—Conc.										
Tellurium... lb.				5,130						5,130
\$				25,599						25,599
Titanium ore ton			2,023							2,023
\$			14,161							14,161
Zinc..... lb.				47,264,342	2,162,938			249,152,403		298,579,683
\$				1,438,538	65,831			7,583,202		9,087,571
Total..... \$	121,765		19,257,887	129,080,031	8,894,576	785,621	13,575	34,312,835	1,644,678	194,110,968
NON-METALLICS FUELS										
Coal..... ton	6,341,625	314,750			4,113	909,288	4,753,810	1,485,969	638	13,810,193
\$	21,860,093	1,026,343			8,952	1,241,130	12,556,099	5,351,108	2,217	42,045,942
Natural M cu ft.		625,601		7,682,851	600	13,781	14,841,491			23,164,324
gas. \$		306,005		4,741,368	180		3,707,276			8,759,652
Peat..... ton				1,878						1,878
\$				7,343						7,343
Petroleum bri.		11,106		141,385			1,253,966		4,438	1,410,895
crude. \$		22,277		299,874			3,104,823		22,188	3,449,162
Total..... \$	21,860,093	1,354,625		5,048,585	9,132	1,245,953	19,368,198	5,351,108	24,405	54,262,099
OTHER NON-METALLICS										
Actinolite... ton				30						30
\$				365						365
Asbestos..... ton			155,980							155,980
\$			4,936,326							4,936,326
Barytes..... ton										
Bituminous ton										
sands. \$							862			862
Diatomite... ton				46			3,449			3,449
\$				1,920						1,372
Feldspar..... ton	1,320		9,207	7,302	1,793			190		54,910
\$	52,800		78,853	61,665	6,763					18,392
Fluorspar..... ton				150						147,281
\$				2,100						150
Graphite..... ton			129	1,389						2,100
\$			6,426	64,998						1,518
Grindstones (includes pulpstones, etc.)..... ton	50	535								71,424
\$	1,762	27,091						402		987
Gypsum..... ton	378,287	30,398		33,234	9,657			17,625		46,478
\$	488,044	104,709		141,389	81,553			9,661		461,237
Iron oxides ton			4,798					48,081		863,776
(ochre). \$			64,566					161		4,959
Magnesitic dolomite... \$			382,927					1,600		66,166
Magnesium ton								42		382,927
sulphate. \$								1,100		42
Mica..... lb.			643,967	1,236,302				115,000		1,995,269
\$			85,967	9,059				2,045		97,071
Mineral imp. gal.			75,665	21,775						97,440
waters. \$			16,116	1,622						17,738
Phosphate..... ton			81							81
\$			683							683
Quartz..... ton	7,292		57,208	89,838	931	92,447		24,847		272,563
\$	12,107		229,817	134,572	3,031	88,748		13,990		482,265
Salt..... ton	42,886			276,751	1,664	452				321,753
\$	191,917			1,734,196	20,137	8,703				1,954,953
Silica brick. M	2,159			369						2,528
\$	71,215			14,730						85,945
Soapstone..... ton			44,297							44,297
Sodium ton								244		244
carbonate. \$								1,920		1,920
Sodium ton						66,821				66,821
sulphate. \$						587,986				587,986
Sulphur (t). ton			4,908	14,598				32,031		51,537
\$			50,398	145,980				319,124		515,502
Talc..... ton				13,934				25		13,959
\$				135,978				502		136,480
Volcanic ton						1		30		31
dust..... \$						20		600		620
Total..... \$	817,845	131,800	5,896,376	2,448,574	111,484	685,457	3,449	406,777		10,501,762

(t) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

Table 1.—Mineral Production of Canada, by Provinces, 1934—Concluded

—	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*	Canada
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS										
Clay Products										
Brick—										
Soft mud process—										
Face.... M	40		1,000	3,514	350					4,904
\$	600		7,000	64,642	4,005					76,247
Common. M	500	1,500	1,580	7,193	1,634	20	763	1,066		14,256
\$	5,000	19,399	13,349	96,776	25,334	325	9,178	14,224		183,585
Stiff mud process (wire cut)—										
Face.... M	545	267	7,637	15,060	160	12	87	32		23,800
\$	11,863	6,846	157,078	311,490	4,224	382	1,601	857		494,341
Common. M	2,695	141	18,404	6,876		173	829	1,199		30,317
\$	32,924	2,239	267,622	97,323		1,936	6,189	15,898		424,131
Dry press—										
Face.... M			610	4,836		47	374	138		6,005
\$			15,951	103,718		1,290	3,857	5,576		130,392
Common. M				2,046		13	3,828	553		6,440
\$				33,177		243	26,937	6,259		66,616
Fancy or ornamental brick... M				14			29			43
\$				835			1,790			2,625
Sewer brick M				307						307
\$				5,992						5,992
Paving brick... M								10		10
\$								382		382
Firebrick. M						558	13	1,538		2,109
\$						28,537	882	71,809		101,219
Fireclay.... ton	24	15				441	50	513		1,043
\$	230	601				3,322	708	7,737		12,598
Kaolin.... ton			48							48
\$			504							504
Fireclay blocks and shapes. \$	367					52,276		9,745		62,388
Structural tile—										
Hollow blocks... ton	1,068	151	13,668	13,576	158	4	1,436	1,075		31,136
\$	10,955	1,276	107,675	102,243	1,941	45	10,438	9,549		244,122
Roofing tile... No.				44,115						44,115
\$				1,852						1,852
Floor tile (quarries) sq. ft.				77,604			2,752			80,356
\$				16,886			605			17,491
Drain tile. M	96	3	540	6,017	41		48	580		7,325
\$	3,179	142	14,191	137,699	2,412		2,144	20,786		180,553
Sewer pipe, copings, flue linings, etc.... \$	91,724		48,952	226,005			47,763	21,989		436,433
Pottery, glazed or unglazed. \$		29,394		52,578			134,585	7,176		223,733
Bentonite... ton								63		63
\$								1,578		1,578
Other clay products... \$	316			9,790		2,641		881		13,628
Total.... \$	157,158	59,897	632,322	1,261,006	37,916	90,997	246,677	194,437		2,680,410
OTHER STRUCTURAL MATERIALS†										
Cement.... brl.			1,613,641	1,702,128	181,166		163,946	122,345		3,783,226
\$			2,294,847	2,403,590	411,247		326,253	232,009		5,667,946
Lime.... ton	8,920	15,752	108,690	191,041	16,568		7,455	19,687		368,113
\$	67,954	126,409	631,984	1,536,289	163,608		65,697	153,856		2,745,797
Sand and gravel.... ton	256,572	568,064	3,672,582	7,880,959	334,026	533,575	650,232	958,149		14,854,159
\$	114,597	322,238	980,454	1,821,689	95,426	169,033	196,898	335,142		4,035,477
Slate.... ton			306	120				312		733
\$			458	600				3,744		4,802
Stone.... ton	123,068	37,918	1,199,152	2,460,300	43,127		2,737	210,714		4,077,016
\$	171,317	161,182	1,575,617	1,965,507	53,545		8,104	217,057		4,152,329
Total.... \$	353,868	609,829	5,483,360	7,727,675	723,826	169,033	596,952	941,808		16,606,351
Grand Total (in Canadian Funds).... \$	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934	2,977,061	20,228,851	41,206,965	1,669,083	278,161,590

* See footnote page 8.

† For non structural uses of lime and stone see chapter 9.

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1933 and 1934 (1)

		1933		1934		Per cent Increase (+) or Decrease (—)	
		Quantity	Value	Quantity	Value	Quantity	Value
METALLICS			\$		\$		\$
Arsenic (As ₂ O ₃).....	lb.	1,468,022	56,534	1,647,513	56,412	+ 12.2	— 0.2
Bismuth.....	lb.	78,303	81,526	253,644	301,215	+ 223.9	+ 269.5
Cadmium.....	.....	.....	78,733	.....	95,665	.....	+ 21.5
Chromite.....	tons	30	343	111	1,578	+ 270.0	+ 360.0
Cobalt.....	lb.	466,702	597,752	594,671	592,497	+ 27.4	— 0.9
Copper.....	lb.	299,982,448	21,634,853	364,761,062	26,671,438	+ 21.6	+ 23.3
Gold.....	fine oz.	2,949,309	60,967,626	2,972,074	61,438,220	+ 0.8	+ 0.8
Estimated exchange equalization paid for gold produced.....	.....	.....	23,382,611	.....	41,098,333	.....	+ 75.8
Lead.....	lb.	266,475,191	6,372,998	346,275,576	8,436,658	+ 29.9	+ 32.4
Manganese ore.....	tons	.....	.....	.....	.....	.....	.....
Molybdenite.....	lb.	.....	.....	.....	.....	.....	.....
Nickel.....	lb.	83,264,658	20,130,480	128,687,340	32,139,425	+ 54.6	+ 59.7
Palladium, Rhodium, Iridium, etc.....	fine oz.	31,009	645,043	83,932	1,699,282	+ 170.7	+ 163.4
Platinum.....	fine oz.	24,786	857,590	116,230	4,490,763	+ 368.9	+ 423.6
Radium and Uranium.....	.....	.....	.....	.....	.....	.....	.....
Selenium.....	lb.	48,221	70,345	104,924	171,311	+ 117.6	+ 143.5
Silver.....	fine oz.	15,187,950	5,746,027	16,415,282	7,790,840	+ 8.1	+ 35.6
Tellurium.....	lb.	.....	5,130	.....	25,599	.....	.....
Titanium ore.....	tons	.....	2,023	.....	14,161	.....	.....
Zinc.....	lb.	199,131,984	6,393,132	298,579,683	9,087,571	+ 49.9	+ 42.2
Total.....	\$		147,015,593		194,110,968		+ 32.0
NON-METALLICS—FUELS							
Coal.....	tons	11,903,344	35,923,962	13,810,193	42,045,942	+ 16.0	+ 17.0
Natural gas.....	M cu. ft.	23,138,103	8,712,234	23,164,324	8,759,652	+ 0.1	+ 0.5
Peat.....	tons	1,131	3,449	1,878	7,343	+ 66.0	+ 112.9
Petroleum, crude.....	brls.	1,145,333	3,138,791	1,410,895	3,449,162	+ 23.2	+ 09.9
Total.....	\$		47,778,436		54,262,099		+ 13.6
OTHER NON-METALLICS							
Actinolite.....	tons	.....	.....	30	365	.....	.....
Asbestos.....	tons	158,367	5,211,177	155,980	4,936,326	— 1.5	— 5.3
Barytes.....	tons	20	60	.....	.....	.....	.....
Bituminous sands.....	tons	466	1,662	862	3,449	+ 85.0	+ 107.5
Diatomite.....	tons	1,789	36,648	1,372	54,910	+ 23.3	+ 49.8
Feldspar.....	tons	10,658	105,117	18,302	147,281	+ 71.7	+ 40.1
Fluorspar.....	tons	73	1,064	150	2,100	+ 105.5	+ 97.4
Graphite.....	tons	405	18,367	1,518	71,424	+ 274.8	+ 288.9
Grindstones†.....	tons	498	21,919	987	46,478	+ 98.2	+ 112.0
Gypsum.....	tons	382,736	675,822	461,237	863,776	+ 20.5	+ 27.8
Iron oxides (ochres).....	tons	4,357	53,450	4,959	66,166	+ 13.8	+ 23.8
Magnetite dolomite.....	.....	.....	360,128	.....	382,927	.....	+ 6.3
Magnesium sulphate.....	tons	120	3,360	42	1,100	— 65.0	— 67.3
Mica.....	tons	944	49,284	998	97,071	+ 5.7	+ 97.0
Mineral waters.....	imp. gal.	38,818	5,441	97,440	17,738	+ 151.0	+ 226.0
Phosphate.....	tons	2,214	5,475	81	683	— 96.3	— 87.5
Quartz.....	tons	185,783	297,820	272,563	482,265	+ 46.7	+ 61.9
Salt.....	tons	280,115	1,939,874	321,753	1,954,953	+ 14.9	+ 0.8
Silica brick.....	M	636	23,185	2,528	85,945	+ 297.5	+ 270.7
Soapstone.....	.....	.....	47,680	.....	44,297	.....	— 7.1
Sodium carbonate.....	tons	559	5,773	244	1,920	— 56.4	— 66.7
Sodium sulphate.....	tons	50,080	485,416	66,821	587,986	+ 33.4	+ 21.1
Sulphur*.....	tons	57,373	510,299	51,537	515,502	+ 10.2	+ 1.0
Talc.....	tons	15,181	143,156	13,959	136,480	— 8.0	— 4.7
Volcanic dust.....	tons	118	2,360	31	620	— 73.7	— 73.7
Total.....	\$		10,004,537		10,501,762		+ 5.0
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Brick—Soft mud process Face.....	M	2,482	41,737	4,904	76,247	+ 97.6	+ 82.7
..... Common.....	M	12,389	156,769	14,256	183,585	+ 15.1	+ 17.1
Stiff mud process Face.....	M	19,602	412,367	23,800	494,341	+ 21.4	+ 20.0
..... (wire cut) Common.....	M	23,894	356,498	30,317	424,131	+ 26.9	+ 19.0
Dry press..... Face.....	M	4,544	101,252	6,005	130,392	+ 32.2	+ 28.8
..... Common.....	M	3,916	44,377	6,440	66,616	+ 64.5	+ 50.1
Fancy or ornamental brick.....	M	630	7,824	43	2,625	— 93.2	— 66.4
Sewer brick.....	M	243	3,693	307	5,992	+ 26.3	+ 62.3
Paving brick.....	M	1	42	10	382	+ 900.0	+ 809.5
Firebrick.....	M	1,547	73,226	2,109	101,219	+ 36.3	+ 38.2

(1) Unless otherwise noted, all total values of mineral production from 1931 to 1934, inclusive, include estimated exchange equalization on gold produced.

† Includes grindstones, pulpstones and scythestones.

* Sulphur content of pyrites shipped and estimated sulphur contained in the sulphuric acid made from smeltergases.

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1933 and 1934—Concluded

	1933		1934		Per cent Increase (+) or Decrease (—)	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—Concluded						
Fireclay and other clay..... tons	1,421	11,273	1,043	12,598	— 20·6	+ 11·8
Kaolin..... tons		80,625	48	504		— 22·6
Fireclay blocks and shapes.....		160,059		62,388		+ 52·5
Hollow blocks..... tons	26,747	1,136	31,136	244,122	+ 16·4	+ 63·0
Roofing tile..... No.	20,469	80,356	44,115	17,491	+ 115·5	+ 22·3
Floor tile (quarries)..... sq. ft.	91,495	222,829	80,356	180,553	— 12·2	— 19·0
Drain tile..... M	10,057	354,458		436,433	— 27·2	+ 23·1
Sewer pipe, copings, flue linings, etc.....		202,500		223,732		+ 10·5
Pottery, glazed or unglazed.....		1,363	63	1,578	+ 14·5	+ 15·8
Bentonite..... tons	55	16,510		13,628		— 17·5
Other clay products.....						
Total..... \$		2,262,835		2,680,410		+ 18·5
Cement..... brls	3,007,432	4,536,935	3,783,226	5,667,946	+ 25·8	+ 24·9
Lime..... tons	323,540	2,432,306	368,113	2,745,797	+ 13·8	+ 12·9
Sand and gravel..... tons	11,738,823	4,464,285	14,854,159	4,035,477	+ 26·5	— 9·6
Slate..... tons	250	3,750	738	4,802	+ 195·2	+ 28·1
Stone—						
Granite..... tons	256,723	679,585	200,285	781,739	— 22·0	+ 15·0
Limestone..... tons	2,572,911	2,142,516	3,747,779	3,157,832	+ 45·7	+ 47·4
Marble..... tons	10,897	65,913	13,783	69,475	+ 26·5	+ 5·4
Sandstone..... tons	99,043	108,562	115,169	143,283	+ 16·3	+ 32·0
Total..... \$		14,433,852		16,606,351		+ 15·1
Grand Total (Canadian Funds).... \$		221,495,253		278,161,590		+ 25·6

Prices: Higher prices for metals of the non-metallic and the iron and steel products groups were responsible for the index of articles of mineral origin—raw and partly manufactured—rising from 75·6 in 1933 to 77·5 in 1934. Although gains were recorded for antimony, silver, and tin in the non-ferrous series, these were offset by losses for copper, lead and zinc, and the index for this sub-group remained unchanged at 64·3. Articles, raw and partly manufactured of mineral origin, followed practically the same course as the index for Iron and Its Products. It rose from 77·9 in January to a high for the year of 78·0 in February and continued generally downward to 77·8 in December. Non-metallics reached a high of 86·2 in February and by December had receded to 86·1 as compared with 86·0 in January. Non-ferrous metals dropped steadily from 67·0 in January to 62·1 in September and then moved gradually up to 63·7 in December.

Electrolytic domestic copper averaged \$8.22 in 1934, as against \$8.68 per 100 pounds, carlots, f.o.b. Montreal in 1933. Quoted on the same basis, lead declined from \$3.71 in 1933 to \$3.41 in 1934 and zinc from \$4.49 to \$4.06. Fine silver, at New York, rose from 37·6c. to 47·4c. per ounce (Canadian funds). Tin ingots, Straits, f.o.b. Toronto advanced from 45·7c. to 56·9c. per pound.

There were marked gains in quotations for scrap iron and steel. No. 1 scrap steel, charging box size, changed from \$6.88 to \$9.21 per gross ton delivered at Canadian consuming mill. No. 1 machinery cast iron was \$2.25 higher at \$9.83 per gross ton, delivered at Canadian foundry.

The major price changes in the non-metallic group were recorded for coal, and petroleum products. Imported United States bituminous run of mine rose from \$5.35 to \$5.73 and slack from \$4.85 to \$5.13 per ton ex yard, Montreal. Gasolene prices per gallon, tank wagon basis, at specified cities for 1933 and 1934 were as follows:—Montreal, 16·8c. and 18·0c.; Toronto, 17·3c. and 16·3c.; Winnipeg, 19·8c. and 21·7c.; and Calgary, 20·9c. and 22·5c. respectively. (*Internal Trade Branch—Dominion Bureau of Statistics.*)

Table 3.—Exchange Quotations at Montreal, 1934

	New York funds	London Sterling 4·8666	France Franc ·0392	Germany Reichsmark ·2382	Italy Lira ·0526	Japan Yen ·4985
January.....	1·0047	5·0702	·0625	·3781	·0839	·3046
February.....	1·0084	5·0777	·0652	·3931	·0869	·3022
March.....	1·0022	5·1065	·0660	·3978	·0861	·3019
April.....	·9979	5·1476	·0661	·3954	·0856	·3039
May.....	·9982	5·1002	·0661	·3942	·0852	·3030
June.....	·9922	5·0122	·0656	·3813	·0855	·2980
July.....	·9883	4·9851	·0652	·3818	·0849	·2959
August.....	·9769	4·9509	·0651	·3862	·0848	·2943
September.....	·9714	4·8551	·0649	·3917	·0845	·2904
October.....	·9791	4·8431	·0649	·3964	·0844	·2822
November.....	·9761	4·8724	·0644	·3925	·0835	·2846
December.....	·9878	4·8865	·0652	·3970	·0844	·2855

NOTE.—The nominal closing quotations in Canadian funds upon which these averages are based have been supplied by the Bank of Montreal.

Table 4.—Metal Prices, 1930-1934

Metal	Market	Unit	1930	1931	1932	1933	1934
			\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound.....	0·07667	0·06720	0·05592	0·06528	0·08901
Arsenic, white.....	New York.....	Pound.....	0·04	0·045	0·04	0·04	0·04
Cobalt.....	New York.....	Pound.....	2·50	2·50	2·50	2·80	2·50
Cobalt oxide.....	New York.....	Pound.....	2·00	1·75	1·35	1·35	1·35
	New York.....	Pound.....	0·12982	0·08116	0·05555	0·07025	0·08428
Copper.....	Montreal.....	Pound.....	0·1498	0·10006	0·07516	0·08684	0·0822
	London.....	Long ton.....	61·528	42·093	35·962	36·359	33·319
		Fine oz.....	20·67	21·55	23·48	28·60	34·50
Gold (in Canadian funds).....	New York.....	Pound.....	0·05517	0·04243	0·03180	0·03869	0·03860
	Montreal.....	Pound.....	0·05496	0·04168	0·03511	0·03705	0·04488
	London.....	Long ton.....	18·007	12·958	11·913	11·670	10·935
Nickel.....	New York.....	Pound.....	0·36	0·36	0·35	0·35	0·35
Platinum.....	London.....	Fine oz.....	45·358	35·665	*10·104	7·630	7·75
Silver.....	New York.....	Fine oz.....	0·38154	0·287	0·27892	0·34727	0·47973
Tin.....	New York.....	Pound.....	0·31694	0·24467	0·22017	0·39110	0·52191
	St. Louis.....	Pound.....	0·04556	0·0364	0·02876	0·04029	0·04158
Zinc.....	Montreal.....	Pound.....	0·05084	0·03961	0·03724	0·04488	0·04059
	London.....	Long ton.....	16·570	12·215	13·545	15·666	13·687

* All prices in dollars per unit excepting London copper, lead and zinc prices, which are quoted in £ sterling per long ton, and from 1932 the price of platinum is quoted in £ sterling per fine ounce.

Table 5.—Annual Values of the Mineral Production of Canada, 1925-1934

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1925.....	226,583,333	24·38	1930.....	279,873,578	27·42
1926.....	240,437,123	25·44	1931.....	230,434,726	22·21
1927.....	247,356,695	25·67	1932.....	191,228,225	18·20
1928.....	274,989,487	27·96	1933.....	221,495,253	20·74
1929.....	310,850,246	31·00	1934.....	278,161,590	25·67

NOTE.—For years 1886 to 1924 see previous reports.

Table 6.—Annual Values of the Mineral Production of Canada, by Classes, 1925-1934

Year	Metallics	Non- metallics, including fuels	Clay products and other structural materials	Total
	\$	\$	\$	\$
1925.....	117,082,298	71,851,801	37,649,234	226,583,333
1926.....	115,237,581	85,240,144	39,959,398	240,437,123
1927.....	113,561,030	88,986,246	44,809,419	247,356,695
1928.....	132,012,454	93,239,852	49,737,181	274,989,487
1929.....	154,454,056	97,861,356	58,534,834	310,850,246
1930.....	142,743,764	83,402,349	53,727,465	279,873,578
1931.....	120,930,147	65,346,284	44,158,295	230,434,726
1932.....	112,041,763	56,788,179	22,398,283	191,228,225
1933.....	147,015,593	57,782,973	16,696,687	221,495,253
1934.....	194,110,968	64,763,861	19,286,761	278,161,590

NOTE.—For years 1907-1924 see previous reports.

Table 7.—Values of the Mineral Production of Canada, by Provinces, 1925-1934

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1925	17,625,612	1,743,858	24,284,527	87,980,436	2,276,759	1,076,392	25,318,866	64,485,242	1,791,641
1926	28,873,792	1,811,104	25,956,193	84,702,296	3,073,528	1,193,394	26,977,027	65,622,976	2,226,813
1927	30,111,221	2,148,535	28,870,403	89,982,962	2,888,912	1,455,225	29,309,223	60,801,170	1,789,044
1928	30,524,392	2,198,919	37,037,420	99,584,718	4,186,853	1,719,461	32,531,416	64,496,351	2,709,957
1929	30,904,453	2,439,072	46,358,285	117,662,505	5,423,825	2,253,506	34,739,986	68,162,878	2,905,736
1930	27,019,367	2,383,571	41,215,220	113,530,976	5,453,182	2,368,612	30,427,742	54,953,320	2,521,588
1931	21,081,157	2,176,910	35,964,537	97,975,915	10,057,808	1,931,880	23,580,901	35,480,701	2,184,917
1932	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365	1,681,728	21,174,061	27,326,173	2,014,618
1933	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,504	2,073,052
1934	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934	2,977,061	20,228,851	41,206,965	1,669,083

NOTE.—For years 1899-1924 see previous reports.

* Includes small production from the Northwest Territories since 1932.

Table 8.—Percentage of the Total Value of the Mineral Production of Canada, by Provinces, 1930-1934

Province	1930	1931	1932	1933	1934
Nova Scotia	9.65	9.24	8.9	7.7	8.4
New Brunswick	0.84	0.96	1.2	0.9	0.8
Quebec	14.73	15.65	13.4	12.7	11.2
Ontario	40.57	42.15	43.5	49.8	52.3
Manitoba	1.95	4.37	4.8	4.1	3.5
Saskatchewan	0.85	0.85	0.9	1.1	1.1
Alberta	10.87	10.34	11.6	8.9	7.3
British Columbia	19.64	15.50	14.7	13.9	14.8
*Yukon	0.90	0.94	1.0	0.9	0.6
Canada	100.00	100.00	100.00	100.00	100.00

* Includes small production from the Northwest Territories since 1932.

NOTE.—In the following provincial tables the value of gold includes the exchange equalization. For further information on the price of gold see Chapter II.

Table 9.—Mineral Production of Nova Scotia,* 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	964	22,634	1,382	39,525	3,525	121,613
Silver..... fine oz.	47	15	104	39	321	152
Manganese ore..... tons						
NON-METALLICS—						
Barytes..... tons						
Coal..... tons	4,084,581	15,167,793	4,557,590	15,969,793	6,341,625	21,860,093
Diatomite..... tons	1,428	28,760	1,747	34,940	1,320	52,800
Grindstones..... tons	12	433	21	868	50	1,762
Gypsum..... tons	341,508	398,861	315,948	363,528	378,287	488,044
Quartz..... tons			1,017	1,447	7,292	12,107
Salt..... tons	31,897	150,708	34,278	161,889	42,886	191,917
Silica brick..... M			453	15,834	2,159	71,215
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		172,557		125,500		157,158
Lime—						
Quicklime..... tons	6,075	30,954	3,325	24,270	8,298	63,630
Hydrated..... tons	458	4,580	589	5,890	622	4,324
Sand and gravel..... tons	423,487	136,677	282,228	126,031	256,572	114,597
Stone..... tons	34,661	87,307	41,449	96,629	123,068	171,317
Total		16,201,279		16,966,183		23,310,729

* In 1934, 133,360 long tons of pig iron were produced in Nova Scotia from Newfoundland ores: production in 1933 totalled 118,514 long tons.

Table 10.—Mineral Production of New Brunswick, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Manganese ore..... tons						
Non-METALLICS—						
Coal..... tons	212,695	794,168	312,303	1,041,744	314,750	1,026,343
Grindstones..... tons	256	11,802	277	12,051	535	27,091
Gypsum..... tons	38,019	297,520	30,391	88,500	30,398	104,709
Manganese bog..... tons						
Natural gas..... M cu. ft.	662,452	326,191	618,033	302,706	625,601	306,005
Petroleum..... brls.	6,408	14,332	8,835	18,111	11,106	22,277
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		68,151		46,917		59,897
Lime—						
Quicklime..... tons	5,547	59,064	8,059	68,446	8,949	76,132
Hydrated..... tons	6,025	50,120	8,790	66,340	6,803	50,277
Sand and gravel..... tons	569,150	447,239	496,961	331,497	568,064	322,238
Stone..... tons	16,805	154,918	16,714	131,370	37,918	161,182
Total..... \$		2,223,505		2,107,682		2,156,151

Table 11.—Mineral Production of Quebec,* 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Chromite..... tons	78	1,113	30	343	71	1,098
Copper..... lb.	67,336,692	4,296,216	69,943,882	5,214,177	73,968,545	5,487,948
Gold..... fine oz.	401,105	9,417,572	382,886	10,950,539	390,097	13,458,347
Selenium..... lb.			22,131	16,600	48,764	73,146
Silver..... fine oz.	628,902	199,184	471,419	178,351	470,254	223,187
Titanium ore, sold for export..... tons					2,023	14,161
Non-METALLICS—						
Asbestos..... tons	122,977	3,039,721	158,367	5,211,177	155,980	4,936,326
Feldspar..... tons	3,390	39,062	6,183	59,283	9,207	78,853
Graphite..... tons			43	2,222	129	6,426
Iron oxides (ochre)..... tons	5,017	44,161	4,192	51,965	4,758	64,566
Magnesian dolomite.....		262,860		360,128		382,927
Mica..... tons	41	4,076	256	39,060	322	85,967
Natural mineral waters..... imp. gal.	15,506	4,697	9,024	3,094	75,665	16,116
Peat.....	762	2,286	681	2,549		
Phosphate..... tons	1,316	12,333	105	805		683
Quartz..... tons	20,123	71,645	28,294	109,533	57,208	229,817
Sulphur..... tons	17,954	133,838	19,167	146,261	4,908	50,398
Soapstone.....		46,751		47,680		44,297
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	2,210,584	3,155,702	1,517,555	2,128,900	1,613,641	2,294,847
Clay products.....		1,064,551		580,088		632,322
Lime—						
Quicklime..... tons	76,933	493,787	89,740	539,603	85,106	510,614
Hydrated lime..... tons	16,830	94,114	20,594	107,955	23,584	121,370
Sand and gravel..... tons	3,458,128	893,896	3,356,232	942,429	3,672,582	980,454
Stone..... tons	2,246,825	2,360,901	1,342,493	1,448,740	1,199,152	1,575,617
Slate..... tons					306	458
Total..... \$		25,638,466		28,141,482		31,269,945

* There is also in this province an important production of aluminium from imported ores.

Table 12.—Mineral Production of Ontario,* 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As ₂ O ₃)..... lb.	2,424,342	98,714	1,468,022	56,534	1,647,513	56,412
Bismuth..... lb.	16,798	7,289	7,580	3,731	7,552	3,444
Chromite..... tons					40	480
Cobalt..... lb.	490,631	587,957	466,702	597,752	594,671	592,497
Copper..... lb.	77,055,413	4,407,928	145,504,720	10,118,847	205,059,539	14,822,704
Gold..... lb.	2,280,105	53,534,743	2,155,519	61,647,843	2,105,339	72,634,195
Lead..... lb.	86,477	1,828	29,910	692	21,558	525
Nickel..... lb.	30,327,968	7,179,862	83,264,658	20,130,480	128,687,340	32,139,425
Palladium, Rhodium, etc..... fine oz.	37,613	901,890	31,009	645,043	83,932	1,699,282
Platinum..... fine oz.	27,284	1,097,021	24,746	856,190	116,177	4,488,712
Selenium..... lb.			26,090	53,745	51,574	91,286
Silver..... fine oz.	6,335,788	2,006,648	4,535,680	1,715,975	5,321,160	2,525,470
Tellurium..... lb.					5,130	25,599
Non-METALLICS—						
Actinolite..... tons					30	365
Barytes..... tons			20	60		
Diatomite..... tons	11	309	28	1,298	46	1,920
Feldspar..... tons	3,657	42,920	4,387	45,350	7,302	61,665
Fluorspar..... tons	32	464	73	1,064	150	2,100
Graphite..... tons	346	18,483	362	16,145	1,389	64,998
Gypsum..... tons	35,655	186,175	24,460	112,319	33,234	141,389
Mica..... tons	269	2,752	666	9,371	618	9,059
Natural mineral waters..... imp. gal.	61,208	2,473	29,794	2,347	21,775	1,622
Natural gas..... M cu.ft.	7,386,154	4,719,297	7,166,659	4,523,085	7,682,851	4,741,368
Peat..... tons	2,486	5,307	450	900	1,878	7,343
Petroleum..... brls.	130,343	247,468	136,058	253,486	141,385	299,874
Quartz..... tons	66,135	93,574	66,562	86,146	89,838	134,572
Salt..... tons	231,138	1,789,751	244,107	1,755,087	276,751	1,734,196
Silica brick..... M	93	4,304	183	7,351	369	14,730
Sulphur..... tons	3,332	33,320	8,196	81,960	14,598	145,980
Talc..... tons	12,064	111,585	15,114	142,134	13,934	135,978
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	1,599,342	2,288,975	1,095,845	1,587,812	1,702,128	2,403,590
Clay products.....		1,639,508		1,024,579		1,261,006
Lime—						
Quicklime..... tons	143,185	1,018,007	126,460	1,006,906	168,760	1,287,251
Hydrated..... tons	23,518	255,223	19,733	220,191	22,281	249,038
Sand and gravel..... tons	6,994,447	1,971,239	5,967,994	2,517,230	7,880,959	1,821,689
Stone..... tons	1,905,138	1,655,016	1,253,906	983,268	2,460,300	1,965,507
Slate..... tons					120	600
Total..... \$		85,910,030		110,205,021		145,565,871

*The total production of blast-furnace pig-iron in Ontario in 1932 was 113,433 long tons, in 1933, 108,803 long tons and in 1934, 271,635 long tons.

†Sulphur content of pyrites shipped or estimated sulphur contained in the sulphuric acid made from smelter gases.

Table 13.—Mineral Production of Manitoba, 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Copper..... lb.	52,706,861	3,362,803	38,163,181	2,844,989	30,867,141	2,290,126
Gold..... fine oz.	122,507	2,876,350	125,310	3,583,866	132,321	4,565,075
Selenium..... lb.					4,127	6,190
Silver..... fine oz.	1,036,497	328,275	1,101,578	416,758	1,252,920	594,647
Zinc..... lb.	41,736,600	1,004,016	43,516,037	1,397,082	47,264,342	1,438,538
Non-METALLICS—						
Coal..... tons	1,552	3,684	3,880	9,214	4,113	8,952
Feldspar..... tons			88	484	1,793	6,763
Gypsum..... tons	12,719	113,739	6,830	65,471	9,657	81,553
Natural gas..... M cu. ft.	600	180	600	180	600	180
Quartz..... tons	87,453	102,493	7,736	23,507	931	3,031
Salt..... tons	508	7,092	1,499	18,388	1,664	20,137
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	242,112	549,594	129,540	295,351	181,166	411,247
Clay products.....		49,773		20,966		37,916
Lime—						
Quicklime..... tons	15,047	116,369	14,793	110,957	12,988	100,958
Hydrated..... tons	3,188	55,741	3,239	56,683	3,580	62,650
Sand and gravel..... tons	440,309	188,974	288,214	108,828	334,026	95,426
Stone..... tons	78,423	299,282	33,190	74,227	43,127	53,545
Total..... \$		9,058,365		9,026,951		9,776,934

Table 14.—Mineral Production of Saskatchewan, 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Copper..... lb.			3,223,941	240,338	6,618,913	491,077
Gold..... fine oz.	11	258	5,400	154,440	5,405	186,472
Selenium..... lb.					459	689
Silver..... fine oz.	14	4	114,604	43,358	87,551	41,552
Zinc..... lb.			2,789,683	89,563	2,162,938	65,831
Coal..... tons	887,139	1,229,449	927,649	1,285,996	909,288	1,241,130
Quartz..... tons			59,506	59,506	92,447	88,748
Salt..... tons			231	4,510	452	8,703
Sodium sulphate..... tons		271,736	50,080	485,416	66,821	587,986
Volcanic dust..... tons	180	3,600	118	2,360	1	20
Natural gas..... M cu. ft.					13,781	4,823
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products..... tons		109,739		92,207		90,997
Sand and gravel..... tons	362,841	66,942	104,400	19,731	533,575	169,033
Total.....		1,681,728		2,477,425		2,977,061

Table 15.—Mineral Production of Alberta, 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	83	1,949	324	9,267	393	13,558
Silver..... fine oz.	9	3	32	12	35	17
NON-METALLICS—						
Bituminous sands..... tons	343	1,372	466	1,662	862	3,449
Coal..... tons	4,870,648	13,526,309	4,718,788	12,307,258	4,753,810	12,556,099
Natural gas..... M cu. ft.	15,370,968	3,853,794	15,352,811	3,886,263	14,841,491	3,707,276
Petroleum..... brls.	906,751	2,751,541	995,832	2,844,157	1,253,966	3,104,823
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	193,571	399,922	149,206	299,530	163,946	326,253
Clay products.....		329,584		198,373		246,677
Lime—						
Quicklime..... tons	6,529	55,336	7,403	61,061	7,300	64,143
Hydrated..... tons	113	1,241	98	976	155	1,554
Sand and gravel..... tons	734,067	250,025	281,122	85,577	650,232	196,898
Stone..... tons	1,428	2,985	1,550	8,817	2,737	8,104
Total..... \$		21,174,061		19,702,953		20,228,851

Table 16.—Mineral Production of British Columbia, 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Bismuth..... lb.	57	51	70,723	77,795	246,092	297,771
Cadmium.....		26,824		78,733		95,665
Copper..... lb.	50,580,104	3,227,111	43,146,724	3,216,502	48,246,924	3,579,583
Gold..... fine oz.	199,004	4,672,429	238,995	6,835,257	296,196	10,218,762
Lead..... lb.	252,007,674	5,326,432	263,345,776	6,298,178	344,467,138	8,592,597
Platinum..... fine oz.		2,372	40	1,400	53	2,051
Silver..... fine oz.	7,293,462	2,309,858	6,737,057	2,548,817	8,729,721	4,143,204
Zinc..... lb.	130,546,958	3,140,438	152,826,264	4,906,487	249,152,403	7,583,202
NON-METALLICS—						
Coal..... tons	1,681,490	6,392,801	1,382,272	5,306,287	1,485,969	5,351,103
Diatomite..... tons	47	440	14	410	6	190
Grindstones, pulpstones..... tons	60	3,500	200	9,000	402	17,625
Gypsum..... tons	10,728	84,084	5,107	46,004	9,661	48,081
Iron oxides (ochre)..... tons	223	2,000	165	1,485	161	1,600
Magnesium Sulphate..... tons			120	3,360	42	1,100
Mica..... tons			23	853	57	2,045
Phosphate..... tons			2,109	4,670		
Quartz..... tons	15,621	8,435	22,668	17,681	24,847	13,990
Sodium carbonate..... tons	495	5,450	559	5,773	244	1,920
Sulphur*..... tons	31,886	302,856	30,010	282,078	32,031	319,124
Talc..... tons	39	702	67	1,022	25	502
Volcanic dust..... tons					30	600

* Includes sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

Table 16.—Mineral Production of British Columbia, 1932-1934—Concluded

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	253,112	536,528	115,286	225,342	122,345	232,009
Clay products.....		216,355		174,205		194,437
Lime—						
Quicklime..... tons	14,902	141,998	18,147	144,479	16,721	135,528
Hydrated..... tons	2,250	18,003	2,570	18,449	2,966	18,328
Sand and gravel..... tons	1,487,513	525,604	961,672	332,962	958,149	335,142
Slate..... tons	250	3,750	250	3,750	312	3,744
Stone..... tons	407,642	378,052	250,272	253,525	210,714	217,057
Total.....		27,326,173		30,794,504		41,206,965

Table 17.—Mineral Production of the Yukon, 1932-1934

Product	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	40,608	953,438	39,493	1,129,500	38,798	1,338,531
Lead..... lb.	3,853,327	81,444	3,099,505	74,128	1,783,349	43,450
Silver..... fine oz.	3,014,755	954,822	2,204,237	833,925	515,542	244,681
NON-METALLICS—						
Coal..... tons	808	3,491	862	3,670	638	2,217
Total.....		1,993,195		2,041,223		1,628,879

Table 18.—Mineral Production of the Northwest Territories, 1932-1934

Product	1932		1933		1934*	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Radium and Uranium products.....	Data not available	for publication.				
Lead..... lb.					3,531	86
Silver..... fine oz.	38,433	12,172	23,239	8,792	37,778	17,930
Petroleum, crude..... brl.	910	9,251	4,608	23,037	4,438	22,188
Total.....		21,423		31,829		40,204

* During 1934 the Port Hope (Ontario) refinery of Eldorado Gold Mines Ltd. received from the Eldorado mine at Great Bear Lake, N.W.T., 77 tons of pitchblende and silver ore and seven tons of concentrates.

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1930-1934

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity for heat and power	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Metal Mining Industry							
ALLUVIAL GOLD MINES							
1930.....	79	79	5,881,620	394	612,369	8,272	877,778
1931.....	109	109	5,908,001	337	682,935	41,745	1,226,541
1932.....	120	120	7,306,130	373	665,711	38,840	1,211,018
1933.....	73	74	10,402,705	454	704,151	35,165	1,218,250
1934.....	93	93	14,315,701	615	1,027,569	76,615	1,260,483

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1930-1934—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
AURIFEROUS QUARTZ MINES							
1930.....	54	56	119,758,057	8,401	14,034,620	2,364,102	39,771,739
1931.....	68	69	109,933,164	9,636	16,467,165	2,700,326	49,144,578
1932.....	100	100	58,167,335	10,442	17,686,584	3,031,494	58,645,772
1933.....	214	216	158,599,931	12,823	20,536,012	3,330,137	69,151,535
1934.....	408	416	214,068,359	17,762	27,156,887	4,249,296	83,761,440
COPPER-GOLD-SILVER MINES (a)							
1930.....	61	68	45,844,395	5,694	9,156,759	1,272,262	15,629,564
1931.....	53	56	37,127,920	3,351	4,958,317	726,502	15,951,103
1932.....	28	30	19,793,372	3,076	3,770,627	463,463	11,143,759
1933.....	28	29	40,228,626	2,841	3,938,778	404,625	7,707,270
1934.....	21	23	39,892,387	3,169	4,869,801	542,670	8,265,071
SILVER-CORALIT MINES							
1930.....	23	28	12,268,322	1,043	1,488,591	352,844	3,637,181
1931.....	22	26	9,352,520	786	1,149,689	227,467	1,925,593
1932.....	17	20	3,005,872	369	551,255	124,478	1,735,708
1933.....	12	14	3,365,755	242	322,281	83,565	1,071,602
1934.....	15	16	5,102,491	286	361,726	85,685	1,380,318
SILVER-LEAD-ZINC MINES*							
1930.....	86	93	42,053,674	2,866	4,263,961	654,685	13,000,815
1931.....	39	40	31,152,078	1,299	2,149,921	485,106	6,351,975
1932.....	36	36	11,921,067	1,084	1,719,186	358,649	5,156,365
1933.....	42	43	17,705,026	1,100	1,501,012	284,277	7,569,867
1934.....	58	60	12,923,827	1,292	1,935,284	389,276	8,885,081
NICKEL-COPPER MINES							
1930.....	2	5	26,194,605	3,483	5,388,783	200,151	8,460,556
1931.....	3	6	21,320,977	2,133	3,150,240	105,403	7,539,836
1932.....	3	6	23,137,628	1,210	1,776,190	96,670	3,174,208
1933.....	4	7	30,048,125	1,599	2,518,181	152,984	6,108,325
1934.....	4	7	31,685,426	2,677	4,375,702	233,963	11,606,713
MISCELLANEOUS METAL MINES							
1930.....	10	10	427,906	116	110,096	5,100	2,595
1931.....	7	7	444,179	82	25,694	576	13,434
1932.....	5	5	1,140,200	34	35,181	2,475	1,113
1933.....	5	5	563,500	24	14,275	1,178	343
1934.....	7	7	1,548,205	44	32,273	2,383	15,739
NON-FERROUS METAL SMELTING AND REFINING							
1930.....	10	13	175,010,686	8,626	13,796,124	6,465,897	155,635,664
1931.....	11	14	175,669,195	7,860	13,245,327	6,053,398	150,229,454
1932.....	10	13	149,708,860	5,343	8,778,970	4,435,394	138,722,129
1933.....	11	14	146,085,284	6,360	8,403,181	(b) 2,792,322	157,318,734
1934.....	11	14	146,047,422	8,298	11,059,206	(b) 3,564,712	171,610,687
Total Metal Mining Industries							
1930.....	325	352	427,439,265	30,623	48,851,303	11,323,313	137,015,892
1931.....	312	327	390,905,034	25,434	41,829,288	10,340,523	132,382,514
1932.....	319	330	269,180,464	21,931	34,983,704	8,551,463	119,790,072
1933.....	359	402	406,993,952	25,443	37,937,871	7,084,253	150,145,926
1934.....	617	636	465,583,818	34,143	50,818,448	9,144,600	186,785,532

* Contains data relating to silver ores in the Northwest Territories since 1931. † Value added by smelting.

(a) The considerable decrease in the value of 1933 and 1934 shipments as compared with those for previous years results largely from low copper prices and through companies reporting ore costs rather than estimates of market prices for metal contents. This practice of reporting costs is confined to some of the larger base metal mining companies which operate both mines and metallurgical plants. Decreases of this nature in the value of mine products are compensated for by increases in the non-ferrous smelting and refining industry and thereby do not affect the grand total representing the net value of Canadian mineral sales.

(b) See footnote, tables 25 and 28.

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1930-1934—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
Non-Metal Mining Industries, Including Fuels							
* FUELS							
COAL							
1930.....	390	430	140,316,395	29,172	36,442,361	3,595,416	49,905,327
1931.....	412	452	135,712,866	27,860	28,802,428	3,060,487	37,762,927
1932.....	455	493	131,879,671	26,960	25,042,769	3,066,601	34,984,922
1933.....	496	547	125,740,790	25,375	22,378,736	3,214,632	33,805,148
1934.....	503	534	118,274,406	25,961	25,662,591	3,448,787	39,394,294
NATURAL GAS							
1930.....	124	2,280	70,548,353	1,941	2,349,703	33,811	8,447,385
1931.....	145	2,444	71,085,678	1,692	2,072,022	26,921	8,232,822
1932.....	160	2,418	75,187,066	1,351	1,738,949	32,912	8,188,966
1933.....	174	2,515	80,937,170	1,367	1,650,815	53,994	7,725,951
1934.....	171	2,682	70,767,123	1,553	1,789,811	67,341	7,569,935
PETROLEUM							
1930.....	234	2,324	63,300,244	1,869	3,337,754	363,998	6,481,847
1931.....	160	2,346	57,620,950	1,209	1,634,517	303,511	4,733,287
1932.....	175	2,210	48,568,562	655	776,163	120,842	3,467,538
1933.....	175	2,128	36,972,528	718	773,734	136,278	3,562,170
1934.....	189	2,219	35,408,801	944	1,072,617	168,338	3,622,722
TOTAL FUELS							
1930.....	748	5,034	274,164,992	32,982	42,129,818	3,993,225	64,834,559
1931.....	717	5,242	264,449,494	30,761	32,608,967	3,390,919	60,729,033
1932.....	790	5,121	255,635,299	28,966	27,557,831	3,220,355	46,641,426
1933.....	845	5,190	243,650,488	27,460	24,803,285	3,494,904	45,093,369
1934.....	863	5,485	224,450,830	28,458	28,625,019	3,684,466	50,586,951
OTHER NON-METAL MINING INDUSTRIES							
ARRASIVES—NATURAL							
1930.....	10	10	345,102	45	42,867	4,305	80,108
1931.....	8	8	569,772	31	25,837	3,906	73,452
1932.....	10	10	679,865	36	26,471	2,422	48,844
1933.....	9	10	58,556	19	7,796	1,034	60,927
1934.....	11	12	234,776	34	20,580	2,616	102,008
ASBESTOS							
1930.....	7	8	35,097,872	2,770	3,474,215	1,133,737	8,390,163
1931.....	7	8	40,164,005	1,675	1,836,115	849,047	4,812,886
1932.....	7	8	30,081,362	1,409	1,156,315	827,303	3,039,721
1933.....	7	8	21,109,967	1,629	1,279,093	771,327	5,211,177
1934.....	7	8	21,816,350	1,855	1,608,812	855,556	4,936,326

* Production of peat since 1929 included in the miscellaneous non-metallics.

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1930-1934—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
<i>OTHER NON-METAL MINING INDUSTRIES—Concluded</i>							
FELDSPAR AND QUARTZ							
1930.....	51	52	870,488	429	257,388	35,645	686,596
1931.....	33	36	1,342,668	166	135,809	20,996	490,119
1932.....	33	33	936,177	120	91,603	13,391	358,129
1933.....	28	28	1,143,792	146	117,037	26,327	402,937
1934.....	50	51	1,310,182	312	205,508	45,854	629,546
GYPSUM							
1930.....	16	18	8,796,865	822	781,639	201,409	2,818,788
1931.....	15	19	7,941,082	676	656,590	188,524	2,111,517
1932.....	11	17	8,054,148	478	368,484	122,926	1,080,379
1933.....	10	16	8,769,564	415	263,279	91,518	675,822
1934.....	8	14	7,352,562	428	324,731	118,560	863,776
IRON OXIDES (OCHRE)							
1930.....	4	4	150,704	43	41,238	13,929	83,873
1931.....	4	4	181,535	30	29,194	8,560	49,205
1932.....	4	4	206,863	26	22,909	5,993	46,161
1933.....	4	4	156,551	22	15,631	5,755	53,450
1934.....	4	4	172,730	32	24,980	9,670	66,166
MICA							
1930.....	13	13	441,744	244	63,316	1,102	96,004
1931.....	11	11	276,356	28	22,556	444	54,066
1932.....	5	5	119,670	9	7,864	50	6,828
1933.....	15	15	312,396	41	25,007	80	49,284
1934.....	16	16	139,716	102	50,391	50	97,071
SALT							
1930.....	8	8	4,685,549	381	455,539	197,313	1,694,631
1931.....	7	7	4,196,927	363	446,984	184,001	1,904,149
1932.....	7	8	3,805,008	345	455,049	176,836	1,947,551
1933.....	9	9	3,708,358	400	473,420	191,373	1,939,874
1934.....	9	9	3,711,598	469	551,998	236,257	1,954,953
TALC AND SOAPSTONE							
1930.....	6	6	614,384	141	79,472	16,369	186,216
1931.....	5	5	618,590	70	71,787	19,128	157,083
1932.....	5	5	703,532	83	76,577	17,930	159,038
1933.....	7	7	684,375	103	83,060	26,424	190,836
1934.....	8	8	640,194	112	79,711	26,312	180,777
MISCELLANEOUS							
1930.....	38	38	3,608,896	498	527,183	188,449	1,192,417
1931.....	34	34	5,457,930	275	297,394	205,149	1,247,697
1932.....	35	35	2,072,913	182	155,166	140,396	1,061,779
1933.....	40	40	4,202,736	297	241,999	176,512	1,234,629
1934.....	48	48	3,291,842	393	371,762	240,224	1,162,980

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1930-1934—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
TOTAL OTHER NON-METAL MINING INDUSTRIES							
1930.....	153	157	54,611,604	5,373	5,722,857	1,792,258	15,228,796
1931.....	124	132	60,748,865	3,314	3,522,266	1,479,755	10,900,174
1932.....	117	125	46,659,538	2,638	2,360,438	1,277,247	7,748,430
1933.....	129	137	40,146,295	3,072	2,506,322	1,290,350	9,818,936
1934.....	161	170	38,669,950	3,737	3,233,473	1,535,099	9,993,603
Total Non-Metal Mining Industries, Including Fuels							
1930.....	901	5,191	328,776,596	38,355	47,852,675	5,785,483	80,063,355
1931.....	841	5,374	325,168,359	34,075	36,031,233	4,870,674	61,629,210
1932.....	907	5,246	302,294,837	31,654	29,918,319	4,497,602	54,389,856
1933.....	974	5,327	283,796,783	30,532	27,309,607	4,695,254	54,912,205
1934.....	1,024	5,605	263,120,280	32,195	31,763,492	5,219,565	60,580,554
Clay Products and Other Structural Materials							
CLAY PRODUCTS							
Brick, Tile and Sewer Pipe							
1930.....	186	198	32,757,926	4,870	4,807,380	1,910,899	10,296,960
1931.....	171	185	33,159,664	3,131	3,428,142	1,476,870	7,585,310
1932.....	143	159	24,910,020	1,622	1,469,270	569,515	3,405,295
1933.....	141	152	23,760,177	1,195	1,011,747	366,685	2,062,388
1934.....	134	144	22,633,285	1,444	1,165,740	547,347	2,458,826
STONEWARE AND POTTERY							
1930.....	5	5	672,851	156	153,750	11,707	296,618
1931.....	4	4	659,500	128	113,108	9,568	255,978
1932.....	5	5	437,562	118	107,316	10,288	244,923
1933.....	5	5	451,703	117	90,146	10,636	200,447
1934.....	5	5	413,522	128	97,237	11,385	221,584
TOTAL CLAY PRODUCTS*							
1930.....	191	203	33,430,777	5,026	4,961,130	1,922,606	10,593,578
1931.....	175	189	33,819,164	3,259	3,541,250	1,486,433	7,841,288
1932.....	148	164	25,347,582	1,740	1,576,586	579,808	3,650,218
1933.....	146	157	24,211,880	1,312	1,101,893	577,321	2,262,335
1934.....	139	149	23,046,807	1,572	1,262,977	553,732	2,680,410
OTHER STRUCTURAL MATERIALS†							
CEMENT							
1930.....	8	11	59,210,737	2,317	3,172,198	4,120,367	17,713,067
1931.....	9	12	57,378,436	1,820	2,432,950	3,280,870	15,826,243
1932.....	6	12	55,294,814	1,216	1,344,772	1,701,125	6,930,721
1933.....	6	12	54,403,379	740	781,746	982,087	4,536,935
1934.....	5	11	53,413,000	860	1,009,686	1,206,550	5,667,946

*Includes kaolin and other clays.

†A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see Chapter 9.

Table 19.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1930-1934—Concluded

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
------	------------------------	--	------------------------	---------------------	--------------------------	---	---

OTHER STRUCTURAL MATERIALS—Concluded

LIME

1930.....	44	50	8,816,879	1,086	1,087,778	886,354	4,038,698
1931.....	54	60	7,289,990	799	785,868	612,278	2,764,415
1932.....	53	60	6,823,949	677	575,072	535,433	2,394,537
1933.....	54	60	8,920,042	696	480,833	473,125	2,432,306
1934.....	53	58	8,497,895	737	535,492	606,335	2,745,797

SANDS AND GRAVEL

1930.....	724	2,993	7,550,217	5,601	2,508,037	331,010	8,344,913
1931.....	704	3,287	8,635,241	3,224	2,878,011	292,892	6,651,165
1932.....	688	4,249	9,542,446	1,743	1,322,201	190,477	4,480,596
1933.....	696	4,598	6,203,113	2,726	1,169,079	129,410	4,464,285
1934.....	794	4,768	4,377,551	1,911	1,236,819	155,194	4,035,477

STONE

1930.....	285	305	22,196,388	6,192	5,542,211	697,060	13,037,209
1931.....	300	329	18,860,796	4,198	4,470,699	625,673	11,075,184
1932.....	296	319	16,727,481	2,509	2,051,395	420,581	4,942,211
1933.....	288	317	15,758,193	1,885	1,250,776	283,454	3,000,326
1934.....	354	425	12,983,836	2,087	1,499,272	311,516	4,157,131

TOTAL OTHER STRUCTURAL MATERIALS

1930.....	1,061	3,359	97,774,221	15,196	12,310,224	6,034,791	43,133,887
1931.....	1,067	3,688	92,164,463	10,041	10,567,538	4,811,713	36,317,007
1932.....	1,043	4,640	88,383,690	6,145	5,293,440	2,847,616	18,748,065
1933.....	1,044	4,987	85,284,732	6,047	3,682,434	1,868,076	14,433,852
1934.....	1,206	5,262	79,272,282	5,595	4,231,259	2,270,595	16,606,351

Total Clay Products and Other Structural Materials

1930.....	1,252	3,562	131,204,998	20,222	17,271,354	7,957,397	53,727,465
1931.....	1,242	3,877	125,983,627	13,300	14,108,778	6,298,151	44,158,295
1932.....	1,191	4,804	113,736,272	7,885	6,870,026	3,427,419	22,398,283
1933.....	1,190	5,144	109,496,612	7,359	4,784,327	2,245,397	16,696,687
1934.....	1,345	5,411	102,319,089	7,167	5,544,246	2,838,327	19,286,761

GRAND TOTAL OF ALL INDUSTRIES

1930.....	2,478	9,105	887,420,859	89,200	113,975,332	25,066,193	270,806,712
1931.....	2,395	9,578	842,060,020	72,809	91,969,299	21,509,348	238,170,019
1932.....	2,417	10,380	635,211,573	61,470	71,772,049	16,476,484	196,578,211
1933.....	2,553	10,873	800,292,347	63,334	70,031,805	14,024,904	221,754,818
1934.....	2,986	11,652	831,023,187	73,505	88,126,186	*17,202,492	266,652,847

*See footnote, table 26.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1930-1934

Year	Number of operating mines, oil and gas wells, quarries, gravel, pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
NOVA SCOTIA						
1930.....	125	65,363,756	15,484	19,284,197	2,410,115	25,043,071
1931.....	244	63,853,580	14,871	15,302,444	2,020,666	19,258,296
1932.....	495	68,415,735	13,706	11,302,801	2,047,874	15,049,226
1933.....	595	59,727,371	13,915	9,852,765	2,219,236	15,744,102
1934.....	171	55,799,825	13,500	13,594,114	2,532,500	21,773,899
NEW BRUNSWICK						
1930.....	113	5,349,073	1,391	1,132,306	162,591	2,350,372
1931.....	116	5,543,570	1,197	1,048,860	163,893	2,137,832
1932.....	563	4,998,656	1,480	1,123,080	96,922	2,185,174
1933.....	399	5,185,718	1,629	1,402,114	83,493	2,088,331
1934.....	418	5,090,927	1,722	1,276,770	98,213	2,137,835
QUEBEC						
1930.....	2,416	140,286,034	15,397	15,190,714	5,885,600	51,673,630
1931.....	2,723	146,067,130	11,141	12,666,586	5,607,812	44,064,907
1932.....	2,487	121,200,895	7,694	8,198,379	4,243,362	32,834,588
1933.....	3,064	127,600,063	8,629	8,621,984	2,953,543	33,888,539
1934.....	3,584	132,819,808	40,362	10,492,169	3,429,003	35,322,932
ONTARIO						
1930.....	5,267	326,396,783	24,706	34,433,915	9,022,652	105,434,625
1931.....	5,409	305,883,585	20,277	30,470,475	7,508,844	98,508,571
1932.....	5,196	244,250,088	16,376	24,412,126	5,447,055	85,868,259
1933.....	5,210	310,789,173	17,306	25,600,168	4,891,054	109,060,404
1934.....	5,527	323,309,378	22,033	32,619,846	6,039,605	140,857,001
MANITOBA						
1930.....	135	35,812,839	3,621	4,372,044	1,205,288	5,665,008
1931.....	107	39,113,921	2,059	3,096,332	796,076	15,122,432
1932.....	133	21,349,000	1,730	2,106,017	479,993	11,396,818
1933.....	120	30,130,497	1,379	1,847,251	234,202	8,433,130
1934.....	128	36,329,062	1,948	2,796,454	486,172	8,696,985
SASKATCHEWAN						
1930.....	144	6,424,080	1,371	1,040,790	229,760	2,333,280
1931.....	111	7,136,859	1,092	896,131	222,526	1,876,284
1932.....	115	6,013,271	924	748,782	152,433	1,626,307
1933.....	134	12,368,385	1,265	1,111,001	238,898	2,614,337
1934.....	179	11,107,998	1,461	1,257,282	285,161	3,055,611
ALBERTA						
1930.....	562	149,974,382	12,675	16,272,916	1,407,136	29,833,896
1931.....	553	141,629,189	10,579	11,357,722	1,198,890	23,021,465
1932.....	567	124,484,909	9,692	10,476,449	804,137	20,701,076
1933.....	575	112,666,472	9,057	9,463,382	805,577	18,945,255
1934.....	588	108,786,069	9,843	9,792,297	888,005	19,056,775

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1930-1934—Concluded

Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity, for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
BRITISH COLUMBIA						
1930.....	319	150,279,895	14,836	21,412,925	4,652,217	45,768,150
1931.....	309	127,009,722	11,297	16,345,887	3,874,529	31,925,780
1932.....	819	91,469,101	9,582	12,642,830	3,094,145	25,071,738
1933.....	765	129,665,431	9,845	11,455,946	2,557,066	29,464,365
1934.....	1,043	144,025,741	12,270	15,482,102	3,389,259	34,661,029
YUKON (a)						
1930.....	24	7,534,017	319	835,525	90,834	2,583,481
1931.....	6	5,822,464	296	784,862	116,112	2,253,422
1932.....	5	8,029,918	286	761,585	110,563	1,845,026
1933.....	11	12,159,207	309	677,194	41,835	1,516,355
1934.....	14	13,754,379	366	815,152	84,574	1,090,780
Canada						
1930.....	9,105	887,420,859	89,200	113,975,332	25,066,193	270,785,513
1931.....	9,578	842,060,020	72,809	91,969,299	21,509,348	238,170,019
1932.....	10,380	685,211,573	61,470	71,772,049	16,476,484	196,578,211
1933.....	10,873	800,292,347	63,334	70,031,805	14,024,904	221,754,818
1934.....	11,652	831,023,187	73,505	88,126,186	*17,202,492	266,652,847

(a) Contains data for the Northwest Territories since 1931.

NOTE.—The increases in column 1 in 1932 for Nova Scotia, New Brunswick and British Columbia were mainly accounted for by more detailed information received from the Provincial Highways Departments on the number of gravel pits in use during the year.

*See footnote, table 25.

Table 21.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1933 and 1934

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total†	Salaries	Wages	Total
	Male	Female					
1933					\$	\$	\$
Nova Scotia.....	390	56	13,469	13,915	799,660	9,053,105	9,852,765
New Brunswick.....	63	17	1,549	1,629	134,678	1,267,436	1,402,114
Quebec.....	681	79	7,869	8,629	1,275,169	7,346,815	8,621,984
Ontario.....	1,396	211	15,699	17,306	3,629,139	21,971,029	25,600,168
Manitoba.....	114	6	1,259	1,379	219,392	1,627,859	1,847,251
Saskatchewan.....	72	9	1,184	1,265	149,460	961,541	1,111,001
Alberta.....	725	84	8,248	9,057	1,551,332	7,912,050	9,463,382
British Columbia.....	931	105	8,809	9,845	1,880,953	9,574,993	11,455,946
Yukon.....	31	2	276	309	98,042	579,152	677,194
Canada.....	4,403	569	58,362	63,334	9,737,825	60,293,980	70,031,805
1934							
Nova Scotia.....	454	60	12,986	13,500	878,799	12,715,315	13,594,114
New Brunswick.....	67	16	1,639	1,722	140,281	1,136,489	1,276,770
Quebec.....	959	80	9,323	10,362	1,609,529	8,882,640	10,492,169
Ontario.....	1,719	261	20,053	22,033	4,213,756	28,406,090	32,619,846
Manitoba.....	190	16	1,742	1,948	374,283	2,422,171	2,796,454
Saskatchewan.....	77	9	1,375	1,461	162,265	1,095,017	1,257,282
Alberta.....	748	88	9,007	9,843	1,612,994	8,179,303	9,792,297
British Columbia.....	1,123	126	11,021	12,270	2,370,216	13,111,886	15,482,102
Yukon and N.W.T.....	32	5	329	366	91,781	723,371	815,152
Canada.....	5,369	661	67,475	73,505	11,453,904	76,672,282	88,126,186

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous year, is the sum of these individual averages.

†The data are not inclusive of individual or syndicates engaged exclusively in prospecting or general exploration.

Table 22.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1933-1934

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1933					\$	\$	\$
METAL MINING							
Alluvial Gold Mines.....	19	3	432	454	49,430	654,721	704,151
Auriferous Quartz Mines.....	873	70	11,880	12,823	2,232,508	18,303,504	20,536,012
Copper-Gold-Silver Mines.....	154	5	2,682	2,841	306,363	3,632,415	3,938,778
Silver-Cobalt Mines.....	24	1	217	242	59,929	262,352	322,281
Silver-Lead-Zinc Mines.....	129	9	962	1,100	278,933	1,222,079	1,501,012
Nickel-Copper Mines.....	56	3	1,540	1,599	166,531	2,351,650	2,518,181
Miscellaneous Metal Mines.....	5	—	19	24	3,312	10,963	14,275
Non-ferrous Smelting and Refining.....	596	83	5,681	6,360	1,461,380	6,941,801	8,403,181
NON-METAL MINING, INCLUDING FUELS							
Fuels							
Coal.....	1,161	122	24,092	25,375	2,477,415	19,901,321	22,378,736
Natural Gas.....	464	124	779	1,367	817,952	832,863	1,650,815
Petroleum.....	91	20	607	718	194,762	578,972	773,734
Other Non-metal Mining							
Abrasives—natural.....	1	—	18	19	1,500	6,296	7,796
Asbestos.....	118	22	1,489	1,629	261,684	1,017,409	1,279,093
Feldspar and Quartz.....	20	3	123	146	34,979	82,058	117,037
Gypsum.....	21	4	390	415	48,942	214,337	263,279
Iron Oxides.....	1	1	20	22	3,212	12,419	15,631
Mica.....	2	1	38	41	2,242	22,765	25,007
Salt.....	46	17	337	400	144,454	328,966	473,420
Talc and Soapstone.....	8	2	93	103	24,096	58,964	83,060
Miscellaneous.....	34	10	253	297	62,364	179,635	241,999

Table 22.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1933-1934—Concluded

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
					\$	\$	\$
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	80	5	655	740	160,680	621,066	781,746
Clay Products.....	207	32	1,073	1,312	440,966	660,927	1,101,893
Lime.....	57	8	631	696	85,861	394,972	480,833
Sand and Gravel.....	58	3	2,665	2,726	106,761	1,062,318	1,169,079
Stone.....	178	21	1,686	1,885	311,569	939,207	1,250,776
Total.....	4,403	569	58,362	63,334	9,737,825	60,293,980	70,031,805
1934							
METAL MINING							
Alluvial Gold Mines.....	48	5	562	615	120,928	906,641	1,027,569
Auriferous Quartz Mines.....	1,518	105	16,139	17,762	3,139,220	24,017,667	27,156,887
Copper-Gold-Silver Mines.....	193	11	2,965	3,169	446,799	4,423,002	4,869,801
Silver-Cobalt Mines.....	29	1	256	286	78,013	283,713	361,726
Silver-Lead-Zinc Mines.....	126	10	1,156	1,292	297,582	1,637,702	1,935,284
Nickel-Copper Mines.....	52	1	2,624	2,677	167,030	4,308,672	4,475,702
Miscellaneous Metal Mines.....	4	1	39	44	6,345	25,928	32,273
Non-ferrous Smelting and Refining.....	737	112	7,449	8,298	1,842,449	9,216,757	11,059,206
NON-METAL MINING, INCLUDING FUELS							
Fuels							
Coal.....	1,174	116	24,671	25,961	2,579,605	23,082,986	25,662,591
Natural Gas.....	485	135	933	1,553	842,059	947,752	1,789,811
Petroleum.....	129	31	784	944	233,657	838,960	1,072,617
Other Non-metal Mining							
Abrasives—natural.....	6	—	28	34	5,208	15,372	20,580
Asbestos.....	125	22	1,708	1,855	281,493	1,327,319	1,608,812
Feldspar and Quartz.....	37	7	268	312	50,888	154,620	205,508
Gypsum.....	35	4	389	428	59,534	265,197	324,731
Iron oxides.....	1	1	30	32	3,432	21,548	24,980
Mica.....	2	2	98	102	2,475	47,916	50,391
Salt.....	53	18	398	469	164,685	387,313	551,998
Talc and Soapstone.....	9	2	101	112	26,516	53,195	79,711
Miscellaneous.....	36	9	348	393	79,333	292,429	371,762
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	79	5	776	869	161,118	848,568	1,009,686
Clay Products.....	186	29	1,357	1,572	389,722	873,255	1,262,977
Lime.....	53	9	675	737	82,983	452,509	535,492
Sand and Gravel.....	53	7	1,851	1,911	75,745	1,161,074	1,236,819
Stone.....	199	18	1,870	2,087	317,085	1,182,187	1,499,272
Total.....	5,369	661	67,475	73,505	11,453,904	76,672,282	88,126,186

* See footnote to table 21.

Table 23.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment During 1933 whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	109	24	8	9	9,774	1,210	253	366	118	90	3,194	25
New Brunswick.....	86	1	4	41	1,063	18	.....	300	13	1	653	66
Quebec.....	545	625	346	144	3,574	176	110	1,515	105	649	4,223	389
Ontario.....	880	49	257	403	9,596	234	985	1,745	2,666	1,385	995	664
Manitoba.....	82	3	45	20	711	29	101	135	.....	468	39	126
Saskatchewan.....	521	5	10	40	734	25	21	184	7	148	287	69
Alberta.....	876	12	266	174	9,260	10	91	91	25	519	285	24
British Columbia.....	3,514	154	370	528	3,632	104	142	281	49	2,169	21	318
†Yukon.....	11	.....	.....	.....	39	.....	.....	16	.....	74	259	32
Canada.....	6,624	873	1,306	1,359	38,383	1,806	1,703	4,633	2,983	5,503	9,956	1,713
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....	18	.....	.....	17	237	.....	12	25	.....	146	259	30
Auriferous Quartz Mines.....	33	4	25	333	7,531	123	420	1,737	1,032	2,227	284	545
Copper-Gold-Silver Mines.....	3	141	226	.....	1,491	205	49	215	.....	835	2	16
Silver-Cobalt Mines.....	1	.....	.....	.....	180	.....	.....	69	.....	6	.....	13
Silver-Lead-Zinc Mines.....	683	.....	.....	.....	195	.....	15	17	.....	288	9	33
Nickel-Copper Mines.....	14	.....	.....	3	1,784	.....	185	106	.....	37	131	297
Miscellaneous Metal Mines.....	3	.....	.....	.....	23	5	.....	1	.....	8	7	1
Non-ferrous Smelting and Refining.....	2,215	111	231	.....	1,058	.....	411	189	1,542	819	117	40
NON-METAL MINING, INCLUDING FUELS—												
Fuels—												
Coal.....	2,009	22	244	575	22,395	1,219	333	492	16	80	489	20
Natural Gas.....	207	3	1	192	157	12	53	159	2	16	167	65
Petroleum.....	152	7	6	.....	116	1	2	17	16	425	49	6
Other Non-metal Mining—												
Abrasives—natural.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	40	.....
Asbestos.....	.....	432	.....	.....	346	.....	.....	167	.....	.....	1,096	3
Feldspar and Quartz.....	6	6	2	2	8	1	5	42	2	3	163	21
Gypsum.....	91	12	9	28	226	7	10	216	109	28	49	27
Iron Oxides.....	9	.....	1	.....	11	1	3	.....	.....	2	12	.....
Mica.....	.....	.....	.....	.....	46	26	.....	7	6	.....	9	.....
Salt.....	10	25	11	12	158	2	7	41	1	3	114	23
Talc and Soapstone.....	18	1	5	.....	1	.....	1	.....	21	1	54	35
Miscellaneous.....	13	2	2	2	91	3	21	37	.....	56	197	54
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	105	21	50	78	412	36	8	.....	1	121	72	63
Clay Products.....	400	34	169	44	334	94	55	280	89	184	257	174
Lime.....	77	17	36	4	211	2	2	153	7	16	223	68
Sand and Gravel.....	186	12	19	3	507	20	17	9	.....	46	5,356	23
Stone.....	371	23	269	66	865	49	89	652	139	156	800	156
Total.....	6,624	873	1,306	1,359	38,383	1,806	1,703	4,633	2,983	5,503	9,956	1,713

†Contains data on mining of silver-pitchblende ores in the Northwest Territories.

Table 24.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment During 1934, whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	55	38	1	3	11,911	1,058	238	311	89	148	634	132
New Brunswick.....	34	6	33	7	1,493	28	34	150	13	40	688	23
Quebec.....	1,177	137	402	88	4,210	356	227	1,473	173	622	4,559	912
Ontario.....	740	59	580	118	10,721	400	2,155	1,942	307	4,961	1,370	1,504
Manitoba.....	31	22	55	10	803	24	9	296	4	829	64	363
Saskatchewan.....	568	1	.....	7	432	251	11	246	11	183	398	127
Alberta.....	1,580	71	227	232	9,177	26	4	171	4	582	125	53
British Columbia.....	3,403	98	251	101	6,065	122	351	363	37	2,813	21	40
†Yukon.....	.....	.....	.....	.....	38	.....	30	.....	.....	69	7	462
Canada.....	7,588	432	1,549	566	44,850	2,265	3,059	4,952	638	10,247	7,866	3,616
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....	1	.....	132	.....	204	.....	.....	13	25	242	21	478
Auriferous Quartz Mines.....	200	55	389	26	9,656	191	1,569	2,122	50	4,584	214	1,872
Copper-Gold-Silver Mines.....	126	24	27	31	1,787	48	155	355	4	845	3	38
Silver-Cobalt Mines.....	9	.....	.....	.....	188	.....	.....	63	.....	46	.....	22
†Silver-Lead-zinc Mines.....	.....	.....	.....	.....	1,053	55	30	3	.....	218	130	13
Nickel Copper Mines.....	5	1	.....	.....	2,128	.....	211	75	4	322	217	25
Miscellaneous Metal Mines.....	1	.....	.....	1	49	12	3	22	.....	3	1	3
Non-Ferrous Smelting and Refining.....	2,685	21	226	.....	1,685	36	536	257	.....	2,643	126	46
NON-METAL MINING, INCLUDING FUELS—												
Fuels—												
Coal.....	2,318	104	135	68	24,778	1,066	268	314	11	109	418	50
Natural gas.....	280	13	28	182	175	21	89	267	3	58	188	97
Petroleum.....	393	6	1	2	136	3	.....	35	2	466	59	23
Other Non-metal Mining—												
Abrasives—natural.....	7	1	.....	.....	.....	1	.....	.....	1	47	9	.....
Asbestos.....	634	56	.....	.....	1	1	.....	.....	.....	.....	1,287	3
Feldspar and Quartz.....	54	.....	.....	.....	39	12	.....	109	2	9	265	10
Gypsum.....	50	3	18	5	271	8	15	32	100	21	117	35
Iron Oxides.....	7	1	1	.....	2	1	16	.....	1	2	19	.....
Mica.....	4	.....	3	.....	16	50	.....	55	12	13	14	.....
Salt.....	.....	2	1	.....	158	4	11	56	4	32	142	55
Talc and Soapstone.....	5	.....	4	1	.....	.....	.....	.....	.....	22	77	20
Miscellaneous.....	32	.....	2	4	46	1	6	67	35	8	119	218
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	43	15	84	22	460	24	15	64	3	128	118	53
Clay Products.....	301	10	258	137	306	179	91	414	175	164	348	173
Lime.....	35	28	51	9	251	27	.....	80	84	17	247	64
Sand and Gravel.....	44	23	22	2	131	289	.....	68	10	63	2,792	104
Stone.....	354	69	167	76	1,330	236	44	481	112	185	935	214
Total.....	7,588	432	1,549	566	44,850	2,265	3,059	4,952	638	10,247	7,866	3,616

†Contains data on mining of silver-pitchblende ores in the Northwest Territories.

Table 25.—Fuel and Electricity Used in the Mineral

Industry	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Canadian	Im-ported		Canadian	Im-ported	
	Tons	Tons	Tons	Tons	Tons	Tons
METAL MINING						
Alluvial Gold Mines.....	Quantity 1	7				
\$	10	540				
Auriferous Quartz Mines.....	Quantity 9,929	11,370	608			233
\$	84,986	100,578	10,667			3,362
Copper-Gold-Silver Mines.....	Quantity 1,824					50
\$	14,157					424
Silver-Cobalt Mines.....	Quantity	883	317			
\$		12,445	4,610			
Silver-Lead-Zinc Mines.....	Quantity 16,921	8				
\$	71,229	1,892				
Nickel-Copper Mines.....	Quantity 16	1,436	353			
\$	165	8,004	5,339			
Miscellaneous Metal Mines.....	Quantity					
\$						
Non-Ferrous Smelting and Refining.....	Quantity 4,315	16,120	84			1,783
(See footnote)	\$ 23,550	88,448	957			16,528
Total.....	Quantity 33,006	29,824	1,362			2,066
\$	194,097	211,907	21,573			20,314
NON-METAL MINING, INCLUDING FUELS						
<i>Fuels</i>						
Coal.....	Quantity 582,624			107,369		
\$	1,842,097			102,047		
Natural Gas.....	Quantity 277	2,082	400	108		2
\$	805	3,921	4,763	450		36
Petroleum.....	Quantity	50		57		
\$		422		285		
Total.....	Quantity 582,901	2,132	400	107,534		2
\$	1,842,902	4,343	4,763	102,732		36
<i>Other Non-Metal Mining</i>						
Abrasives—natural.....	Quantity 144					
\$	1,010					
Asbestos.....	Quantity 14,825	110	6,159			126
\$	99,348	945	41,448			1,502
Feldspar and Quartz.....	Quantity 170	899				16
\$	982	6,099				16
Gypsum.....	Quantity 4,062					148
\$	20,727					1,212
Iron Oxides.....	Quantity 36		16			
\$	250		246			
Mica.....	Quantity					
\$						
Salt.....	Quantity 2,420	38,096				
\$	10,827	156,940				
Talc and Soapstone.....	Quantity 25	49	39			
\$	300	317	432			
Miscellaneous.....	Quantity 6,780	259		10,732		
\$	44,077	1,152		32,340		
Total.....	Quantity 28,462	39,413	6,214	10,732		275
\$	177,521	165,453	42,126	32,340		2,730
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement.....	Quantity 48,905	46,955				
\$	236,947	229,399				
Clay Products.....	Quantity 6,887	33,943		271		115
\$	39,891	200,269		1,068		1,099
Lime.....	Quantity 21,593	27,795	110	34		10,096
\$	120,885	126,097	558	113		64,286
Sand and Gravel.....	Quantity 10,454	694	2			9
\$	51,484	4,508	35			88
Stone.....	Quantity 1,690	3,884	512	21		25
\$	11,649	24,551	3,468	105		308
Total.....	Quantity 89,529	113,271	624	326		10,245
\$	460,856	584,824	4,061	1,286		65,781
Canada.....	Quantity 733,898	184,640	8,600	118,592		12,588
\$	2,675,376	966,537	72,523	136,408		88,861

NOTE.—Fuel and electricity used for metallurgical purposes and not included above consisted of bituminous coal from Canadian mines 244,701 tons, value \$1,657,991; imported bituminous, 109,006 tons at \$578.272; coke, 129,605 tons at \$1,165.432; fuel oil, 7,218,294 gallons at \$327.775; wood, 5,489 cords at \$28.963; manufactured gas, 45,886 M cu. ft., at \$4.998; electricity purchased 380,331,833 K.W.H. at \$1,232,104, and other fuel valued at \$22,079. Total value \$5,017,614.

Industry in Canada, by Kinds and Industries, 1933

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
7,324	830	101,200	2,915						11,301,002
3,134	317	10,600	20,564					35,165	
244,767	9,536	1,828,112	54,405	21			317,550,168	3,330,137	15,758,089
67,325	2,489	189,453	209,011	348		66	2,661,852		
3,170	857	394,568	1,192				68,641,303		25,757,872
990	204	19,211	2,747			15,485	351,407	404,625	
1,358		7,326	410				51,019		
459		1,200	2,472			11,360	5,487,755	83,563	
22,861	369	169,838	60				39,040,970		3,396,440
23,295	135	23,602	263				163,861	284,277	
2,290	1,355	51,449	62				43,546,440		
630	276	4,725	372				133,473	152,984	
295			500				3,000		
78			1,000				100	1,178	
29,541	4,395	3,078,478	160	127,372	79		833,473,571		15,442,203
5,653	948	114,325	657	14,011	69	5,098	2,522,078	2,792,322	
311,606	17,342	5,630,971	59,704	127,393	79		1,307,743,207		71,655,606
101,564	4,369	363,116	237,086	14,359	69	32,009	5,883,790	7,084,253	
45,216	4,112	5,731					89,231,995		45,068,623
11,869	852	844					1,256,923	3,214,632	
22,192	3,000	1,130			79,332		10,996		
5,573	317	80			37,827		222	53,994	
2,562	300	35,630	82		1,645,033		1,448,496		1,859,830
618	36	1,374	246		113,084		20,213	136,278	
69,970	7,412	42,491	82		1,724,365		90,691,487		46,928,453
18,060	1,205	2,298	246		150,911		1,277,358	3,404,904	
100								1,034	
24									
18,289	3,195	6,402					53,024,096		
3,201	490	732					623,661	771,327	
13,152	271	65,026		342			286,762		438,300
3,138	59	5,946		1,300		96	8,691	26,327	
44,697	224	79,716	918		10,763		2,725,415		781,190
11,243	49	3,983	2,891		4,305		47,108	91,518	
	65		783				71,774		
	12		3,094				2,153	5,755	
			80					80	
			80				685,840		5,968,524
200	127	89,369	1,258				7,916	191,373	
62	37	8,043	7,548				1,441,864		
2,675			113				24,388	26,424	
535			452				62,875		1,375,426
43,996	270	1,500,104	459				713	176,512	
7,076	59	89,689	1,406						
123,109	4,152	1,740,617	3,611	342	10,763		58,298,626		8,663,440
25,279	706	108,393	15,471	1,300	4,305	96	714,630	1,290,350	
39,178	581	37					48,160,143		
6,793	102	5					508,841	982,087	
19,424	130	12,622	14,408		173,485		3,749,105		59,578
4,451	27	1,320	52,529		11,232		65,435	377,321	
4,120	35	324,095	35,677	1,300			5,343,821		857,799
889	7	9,865	110,601	780		88	38,956	473,125	
81,157	151	265,770				98	1,990,397		150,000
17,923	28	10,024				39	44,374	129,410	
133,669	620	61,912	2,294				12,470,882		209,380
30,272	97	5,121	6,030			437	201,416	283,454	
277,545	1,517	664,436	52,379	1,300	173,583		71,714,348		1,276,757
60,328	261	26,335	169,160	780	11,271	1,432	859,022	2,245,397	
782,233	30,423	8,078,515	115,776	129,035	1,908,790		1,528,447,668		128,424,256
205,231	6,541	500,142	421,963	16,439	166,556	33,537	8,734,800	14,024,904	

Table 26.—Fuel and Electricity Used in the Mineral

Industry	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Canadian	Im- ported		Canadian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	
METAL MINING						
Alluvial Gold Mines.....	Quantity	31				5
	\$	2,022				504
Auriferous Quartz Mines.....	Quantity	14,988	11,550	870	369	269
	\$	133,711	111,511	12,654	3,440	4,037
Copper-Gold-Silver Mines.....	Quantity	6,843		75		84
	\$	51,804		1,384		1,157
Silver-Cobalt Mines.....	Quantity	6	883	133		
	\$	79	12,261	2,224		
Silver-Lead-Zinc Mines.....	Quantity	27,629	31	3	160	8
	\$	115,669	986	77	873	66
Nickel-Copper Mines.....	Quantity	20	818	3		60
	\$	280	4,791	51		819
Miscellaneous Metal Mines.....	Quantity					
	\$					
Non-Ferrous Smelting and Refining.....	Quantity	3,315	20,131	58		2,371
(See footnote)	\$	15,374	113,051	889		25,506
Total.....	Quantity	52,801	33,444	1,142	529	2,797
	\$	316,917	244,622	17,279	4,313	32,089
NON-METAL MINING, INCLUDING FUELS						
<i>Fuels</i>						
Coal.....	Quantity	625,672		97,110		
	\$	1,963,140		91,487		
Natural Gas.....	Quantity	979	238	100		5
	\$	7,184	1,903	425		36
Petroleum.....	Quantity	1,217				
	\$	5,124				
Total.....	Quantity	627,868	238	97,210		5
	\$	1,975,448	1,903	91,912		36
<i>Other Non-Metal Mining</i>						
Abrasives—natural.....	Quantity	248				
	\$	1,653				
Asbestos.....	Quantity	17,900	14	8,269		110
	\$	120,605	193	52,756		1,309
Feldspar and Quartz.....	Quantity	1,001	1,325			
	\$	7,208	9,057			
Gypsum.....	Quantity	4,223	878		687	180
	\$	23,801	5,486		2,404	1,863
Iron Oxides.....	Quantity		211	19		
	\$		1,477	295		
Mica.....	Quantity					
	\$					
Salt.....	Quantity	4,221	39,767		80	
	\$	17,795	192,352		247	
Talc and Soapstone.....	Quantity	1				
	\$	9				
Miscellaneous.....	Quantity	8,904	631	21	22,331	1
	\$	48,957	2,845	232	59,660	7
Total.....	Quantity	36,498	42,826	8,309	23,098	291
	\$	220,028	211,410	53,283	62,311	3,179
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement.....	Quantity	69,853	60,877			
	\$	367,880	330,432			
Clay Products.....	Quantity	10,706	49,791	66	547	357
	\$	60,073	317,697	626	2,302	3,010
Lime.....	Quantity	29,144	40,156	65	57	10,035
	\$	173,350	194,568	324	189	66,580
Sand and Gravel.....	Quantity	3,007	11,481			4
	\$	15,792	63,728			35
Stone.....	Quantity	1,364	5,143	518		
	\$	10,476	36,052	3,712		
Total.....	Quantity	114,074	167,448	649	604	10,396
	\$	627,571	942,477	4,662	2,491	69,625
Canada.....	Quantity	831,241	243,956	10,100	121,441	13,489
	\$	3,139,964	1,400,412	75,224	161,027	104,929

NOTE.—In addition to the items listed, this Industry consumed for metallurgical purposes 373,362 tons of Canadian bituminous coal valued at \$2,320,909; 50,493 tons of imported bituminous at \$299,398; 261,897 tons of coke at \$2,476,281; 713 gallons of gasoline at \$210; 399 gallons of kerosene at \$89; 9,894,420 gallons of fuel oil at \$554,779; 4,662 cords of wood at \$26,721; 50,418 M cu. ft. of manufactured gas at \$5,848; 411,073,814 K.W.H. of purchased electricity at \$1,197,717, and other fuel valued at \$30,895.

Industry in Canada, by Kinds and Industries, 1934

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K W.H.	\$	K.W.H.
30,950	4,747	107,438	4,075						12,351,000
12,450	2,252	17,404	41,979			4		76,615	
348,584	41,310	3,076,092	108,984	30			415,570,129		29,745,373
116,269	8,215	371,662	395,908	466		276	3,091,147	4,249,296	
46,478	5,214	455,032	1,335				91,206,159		32,425,684
13,937	1,230	28,140	3,451			650	440,917	542,670	
1,208	40	4,118	1,457				5,276,797		
331	9	671	2,717			16,954	50,439	85,685	
21,544	238	382,123	762				37,600,307		16,286,150
20,299	125	58,167	7,408				185,606	389,276	
3,858	1,718	92,814	2,449				61,074,384		1,336,119
1,027	374	8,968	6,573				211,080	233,963	
795	10	180	410				29,734		
227	2	32	1,230				892	2,383	
47,393	7,089	2,741,880	69	92,035	152		1,077,755,407		20,251,795
10,133	1,539	121,952	344	11,320	122	8,852	3,255,630	3,564,712	
500,810	60,366	6,859,677	119,541	92,065	152		1,688,512,917		112,396,121
174,673	13,746	606,996	459,610	11,786	122	26,736	7,235,711	9,144,600	
49,660	4,299	4,570					105,530,072		41,315,731
12,525	1,028	617					1,379,990	3,448,787	
44,908		8,861	72		114,401		23,899		
10,000	6	518	288		46,565		416	67,341	
13,890	416	16,251	750		1,867,580		1,749,478		
3,054	49	4,268	2,250		129,446		24,147	168,338	
108,458	4,755	29,682	822		1,981,981		107,303,449		41,315,731
28,679	1,083	5,403	2,538		176,011		1,404,555	3,684,466	
3,500			40						
850			113					2,616	
29,226	3,664	6,580					67,564,991		
5,356	593	750					673,994	855,556	
30,715	356	104,183	504				452,272		900,000
7,627	78	9,355	1,090				11,439	45,854	
59,979	400	76,252	537	192	17,197		2,912,953		907,492
19,822	95	5,471	2,148	1,098	6,883	59	49,430	118,560	
			664				86,154		
			5,314				2,584	9,670	
162		58							126,329
42		8						50	
3,695	258	113,098	2,774				595,420		6,269,620
899	73	10,881	7,920				6,090	236,257	
7,042	100	720	31				1,428,653		
1,602	20	82	107				24,492	26,312	
25,487		1,611,003	1,154	37,245			1,927,711		1,323,750
5,741		96,578	4,243	3,501		20	18,440	240,224	
159,806	4,778	1,911,894	5,704	37,437	17,197		74,968,154		9,527,191
41,939	859	123,125	20,935	4,599	6,883	79	786,469	1,535,099	
69,890	907	145					48,457,250		
11,908	170	22					496,138	1,206,550	
25,735	650	16,116	19,212	212	412,024		4,679,491		75,540
5,723	106	1,990	71,075	997	8,792	57	86,284	558,732	
7,738	35	327,454	39,467		1,450		6,241,560		342,167
1,492	7	15,230	113,220		840		40,535	606,335	
64,933	107		7		50		2,447,727		150,000
12,832	21		39		30	909	61,808	155,194	
183,764	2,241	100,506	2,955				15,840,918		231,245
39,929	282	9,287	9,186			1,326	201,266	311,516	
332,060	3,940	444,221	61,641	212	413,524		77,666,946		798,952
71,884	586	26,529	193,520	997	9,662	2,292	856,031	2,938,327	
1,121,134	73,839	9,245,474	187,708	129,714	2,412,854		1,948,451,466		164,037,995
314,075	16,274	762,633	676,693	17,382	192,678	29,107	10,312,764	17,202,492	

Table 27.—Fuel and Electricity Used in the Mineral

Province	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Can- adian	Im- ported		Can- adian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	Tons
Nova Scotia.....Quantity	361,890	5				829
\$	1,284,407	80				4,804
New Brunswick.....Quantity	5,838	7				
\$	24,029	122				
Quebec.....Quantity	82,234	29,732	7,045			4,735
\$	450,803	164,544	49,929			35,557
Ontario.....Quantity	19,645	154,422	1,476			6,799
\$	131,159	792,653	21,804			46,449
Manitoba.....Quantity	2,710	388		34		20
\$	20,219	4,310		113		256
Saskatchewan.....Quantity	2,162			42,998		
\$	15,622			66,090		
Alberta.....Quantity	115,580			75,539		
\$	301,800			70,100		
British Columbia.....Quantity	143,817	80	79	21		205
\$	447,259	2,584	790	105		1,795
Yukon.....Quantity	22	6				
\$	78	2,234				
Canada.....Quantity	733,898	184,640	8,600	118,592		12,588
\$	2,675,376	966,527	72,523	136,408		88,861

*See footnote, table 25.

Table 28.—Fuel and Electricity Used in the Mineral

Province	Bituminous coal		Anthra- cite coal	Lignite coal		Coke
	Can- adian	Im- ported		Can- adian	Im- ported	
	Tons	Tons	Tons	Tons	Tons	Tons
Nova Scotia.....Quantity	410,120	154	6			2,640
\$	1,429,427	1,746	91			15,115
New Brunswick.....Quantity	6,011	8				
\$	27,040	130				
Quebec.....Quantity	101,672	28,184	8,903			2,540
\$	581,346	176,722	58,049			19,918
Ontario.....Quantity	19,670	213,783	1,123	68		7,546
\$	147,678	1,200,408	15,285	469		59,231
Manitoba.....Quantity	11,997	1,738		799		57
\$	96,597	17,437		2,678		964
Saskatchewan.....Quantity	3,491			54,126		12
\$	23,966			93,575		190
Alberta.....Quantity	126,363			65,686		
\$	352,173			58,930		
British Columbia.....Quantity	151,894	57	68	762		689
\$	481,668	1,411	1,799	5,379		9,007
Yukon and N.W.T.....Quantity	23	32				5
\$	69	2,558				504
Canada.....Quantity	831,241	243,956	10,100	121,441		13,489
\$	3,139,964	1,400,412	75,224	161,027		104,929

*See footnote, table 26.

Industry in Canada, by Provinces, 1933*

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
53,021 13,079	322 77	47,725 5,375	816 3,066				65,018,005 908,348		14,081,073
5,713 1,519		805 40	8,404 30,640		15,318 7,500		943,001 19,643	2,219,236 83,493	
248,358 57,427	10,210 1,676	1,894,733 112,407	47,333 166,170	342 1,300			247,773,170 1,913,152		7,463,332
323,099 71,669	10,927 2,380	967,988 85,799	32,419 118,600	1,321 1,128	81,410 40,213	578 11,421	526,275,310 3,567,779	2,953,543 4,891,054	13,452,791
15,655 7,320	314 110	39,545 10,374	12,436 51,726				151,244,115 139,774		118,935
43,476 9,101	575 148	1,505,996 90,187	3 14				49,677,889 57,736		1,682,604
18,470 5,168	3,967 798	41,398 2,223	581 2,481		1,812,062 118,843		18,378,699 304,121		16,807,813
61,156 19,686	4,037 1,254	3,578,034 191,972	12,094 31,868	127,372 14,011		21,495	469,137,479 1,824,247	2,557,066	63,611,708
13,285 20,262	71 98	2,291 1,765	1,690 17,398					41,835	11,206,000
782,233 205,231	30,423 6,541	8,078,515 500,142	115,776 421,963	129,035 16,439	1,908,790 166,556	33,537	1,528,447,668 8,734,800	14,024,994	128,424,256

Industry in Canada, by Provinces, 1934*

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
75,779 23,356	817 202	121,659 13,638	2,249 7,190	37,245 3,501		59	78,175,417 1,038,175		15,397,214
9,198 1,995		9,501 546	9,927 32,360		20,304 8,526		853,149 27,616	98,213	
312,615 78,332	15,080 2,886	2,196,565 163,319	59,935 192,209			1,346	339,764,104 2,154,876	3,429,003	10,473,633
441,057 100,948	18,628 4,796	1,007,167 140,179	70,795 237,820	242 1,463	119,631 49,342	17,506	655,437,825 4,064,484	6,039,605	18,398,231
49,001 24,604	2,399 750	53,177 14,114	23,618 113,597	192 1,098		520	171,555,944 183,813	456,172	68,480
46,440 11,017	634 161	1,622,604 98,106	26 131			130	41,551,413 57,885	255,161	1,861,690
29,484 8,300	4,327 1,034	30,703 5,721	1,550 5,662		2,272,919 134,810		21,437,899 321,375	888,005	9,296,146
137,548 44,195	29,881 4,987	4,167,349 310,762	16,026 44,645	92,035 11,320		9,546	639,675,715 2,464,540	3,389,259	96,616,601
20,012 21,328	2,073 1,458	36,749 15,668	3,582 42,989					84,574	11,926,000
1,121,134 314,075	73,839 16,274	9,245,474 762,053	187,708 676,603	129,714 17,382	2,412,854 192,678	29,107	1,948,451,466 10,312,764	17,202,492	164,037,995

Table 29.—Power Employed in the Mineral Industry in Canada, by Provinces, 1934, with Comparative Totals for 1933

Province	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia.....No.	100	13	60	.....	173	690	863	107	149
H.P.	58,619	1,344	2,744	.....	62,707	50,837	113,544	6,371	36,929
New Brunswick.....No.	26	1	38	.....	65	112	177	.....	33
H.P.	1,680	35	1,021	.....	2,716	1,738	4,444	.....	1,715
Quebec.....No.	65	87	129	.....	236	3,639	3,875	163	138
H.P.	2,611	5,306	4,005	1,155	13,077	147,424	160,501	2,763	11,489
Ontario.....No.	200	156	284	16	656	6,630	7,286	830	285
H.P.	18,446	6,853	11,619	6,221	43,139	286,952	330,091	18,184	32,658
Manitoba.....No.	42	6	51	.....	99	1,249	1,348	11	51
H.P.	4,857	546	2,486	.....	7,889	52,696	60,585	135	4,717
Saskatchewan.....No.	58	6	38	.....	102	339	441	112	27
H.P.	4,499	933	1,191	.....	6,623	12,601	19,224	1,296	3,777
Alberta.....No.	230	1	122	.....	353	962	1,315	378	256
H.P.	33,889	75	2,448	.....	36,412	32,672	69,084	11,294	29,679
British Columbia.....No.	141	108	108	77	434	3,354	3,788	1,218	173
H.P.	36,337	11,445	2,411	45,469	95,662	162,960	258,622	46,710	33,557
Yukon and N.W.T.....No.	12	1	13	2	28	.....	28	107	16
H.P.	284	70	318	2,000	2,672	.....	2,672	6,144	515
Canada, 1934.....No.	874	329	843	100	2,146	16,975	19,121	2,926	1,128
H.P.	161,202	26,607	28,243	54,845	270,897	747,870	1,018,767	92,897	155,036
Canada, 1933.....No.	817	150	756	107	1,830	14,917	16,747	2,575	1,022
H.P.	160,764	17,660	23,494	115,428	317,346	699,178	1,016,524	73,157	150,863

NOTE.—Includes stand-by equipment.

Table 30.—Power Employed in the Mineral Industry in Canada, by Industries, 1934, with Comparative Totals for 1933

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold Mines.....No.	12	7	34	10	63	.....	63	118	10
H.P.	284	630	632	2,188	3,734	.....	3,734	6,784	289
Auriferous Quartz Mines.....No.	112	137	175	31	455	3,508	3,963	467	236
H.P.	6,932	17,021	7,257	8,896	40,106	125,739	165,845	11,366	17,173
Copper-Gold-Silver Mines.....No.	6	4	26	7	43	1,510	1,553	138	14
H.P.	3,225	303	1,790	9,300	14,618	65,524	80,142	7,770	3,083
Silver-Cobalt Mines.....No.	3	.....	.....	.....	3	40	43	.....	8
H.P.	235	.....	.....	.....	235	1,473	1,708	.....	575
Silver-Lead-Zinc Mines.....No.	3	18	15	5	41	502	543	236	23
H.P.	6,000	1,683	422	590	8,695	16,914	25,609	6,453	3,361
Nickel-Copper Mines.....No.	1	.....	1	2	4	417	421	14	2
H.P.	80	.....	2	750	832	29,634	30,466	746	233
Miscellaneous Metal Mines.....No.	1	2	4	.....	7	2	9	.....	4
H.P.	25	80	53	.....	158	12	170	.....	140
Non-ferrous Smelting and Refining.....No.	34	.....	15	10	59	5,003	5,062	846	50
H.P.	16,556	.....	543	14,035	31,134	247,889	279,023	16,750	25,701
Total.....No.	172	168	270	65	675	10,982	11,657	1,819	347
H.P.	33,337	19,717	10,699	35,759	99,512	487,185	586,697	49,869	50,555
NON-METAL MINING, INCLUDING FUELS—									
Fuels									
Coal.....No.	399	2	103	2	506	1,672	2,178	597	415
H.P.	108,360	83	1,343	12,000	121,786	79,780	201,566	29,477	75,573
Natural Gas.....No.	16	121	74	.....	211	28	239	13	12
H.P.	565	2,289	2,997	.....	5,851	679	6,530	202	470
Petroleum.....No.	45	.....	72	.....	117	89	206	39	90
H.P.	2,661	.....	1,751	.....	4,412	657	5,069	1,487	6,805
Total.....No.	460	123	249	2	834	1,789	2,623	649	517
H.P.	111,586	2,322	6,091	12,000	132,049	81,116	213,165	31,166	82,848

Table 30.—Power Employed in the Mineral Industry in Canada, by Industries, 1934, with Comparative Totals for 1933—Concluded

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
NON-METAL MINING, INCLUDING FUELS—Conc.									
Other Non-Metal Mining									
Abrasives—natural No. 8			4		12	30	42		4
H.P. 325			112		437	550	987		225
Asbestos.....No. 4					5	690	695		7
H.P. 110			2		112	36,391	36,503		1,100
Feldspar and Quartz.....No. 10		3	16		29	28	57	35	15
H.P. 587		600	717		1,904	635	2,539	208	851
Gypsum.....No. 16		4	42		62	254	316	22	11
H.P. 1,421		536	2,084		4,041	7,642	11,683	538	1,160
Iron Oxides.....No. 1						6	6		1
H.P. 1						81	81		15
Mica.....No. 1			2	1	3	1	4	3	1
H.P. 1			9	145	154	1	155	115	50
Salt.....No. 9		4	4		17	36	53	138	10
H.P. 1,680		580	36		2,296	526	2,822	1,367	3,120
Talc and Soap-stone.....No. 1			8		9	20	29		1
H.P. 1		25	98		123	708	831		80
†Miscellaneous.....No. 5		3	10	2	20	75	95	58	9
H.P. 670		700	666	200	2,236	2,514	4,750	710	875
Total.....No. 52	15	87	3	157	1,140	1,297	256	59	
H.P. 4,793	2,441	3,724	345	11,303	49,048	60,351	2,938	7,476	
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement.....No. 4	2	42	9	57	1,288	1,345	119	15	
H.P. 613	610	1,592	5,336	8,151	75,630	83,781	6,882	587	
Clay Products.....No. 72	3	46		121	523	644	22	81	
H.P. 5,847	232	1,081		7,160	18,010	25,170	768	7,466	
Lime.....No. 11	3	16	2	32	269	301	37	25	
H.P. 410	329	321	60	1,120	5,780	6,900	483	1,795	
Sand and Gravel.....No. 12		32	7	51	199	250	2	8	
H.P. 644		1,368	240	2,252	6,912	9,164	45	565	
Stone.....No. 91	15	101	12	219	785	1,004	22	76	
H.P. 3,972	906	3,367	1,105	9,350	24,189	33,539	746	3,744	
Total.....No. 190	23	237	30	480	3,064	3,544	202	205	
H.P. 11,486	2,077	7,729	6,741	28,033	130,521	158,554	8,924	14,157	
Grand total 1934.....No. 874	329	843	100	2,146	16,975	19,121	2,926	1,128	
H.P. 161,202	26,607	28,243	54,845	270,897	747,870	1,018,767	92,897	155,036	
Grand total 1933.....No. 817	150	756	107	1,830	14,917	16,747	2,575	1,022	
H.P. 160,764	17,660	23,494	115,428	317,346	699,178	1,016,524	73,157	150,863	

†Includes data for peat.

Table 31.—Accidents in the Mining Industry in Canada, by Provinces*, during 1933 and 1934

Cause of accident	Nova Scotia		New Brunswick		Quebec		Ontario		Saskatchewan		Alberta		British Columbia		Canada	
	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal	Fatal	Non-fatal
UNDERGROUND—																
Falls of roof or face.....	15	442	1	98	...	57	7	107	1	62	6	46	11	328	41	1,140
Mine cars and locomotives.....	10	288	...	46	...	36	1	121	...	33	3	31	4	122	18	677
Gas and dust explosions.....	2	1	...	1	...	...	...	...	...	...	3	2	...	3	5	7
Explosives.....	...	1	...	4	4	9	4	27	...	...	...	2	2	8	10	51
Electricity.....	...	...	...	...	...	...	...	...	...	...	9	...	...	4	...	13
Miscellaneous.....	4	600	...	97	3	70	10	1,030	...	128	...	33	10	645	27	2,603
Total.....	31	1,332	1	246	7	172	22	1,285	1	223	12	123	27	1,110	101	4,491
SURFACE—																
Haulage and cars.....	...	38	1	5	...	61	1	11	...	34	...	3	...	24	2	176
Machinery.....	1	16	...	11	2	41	4	50	...	6	...	5	1	15	8	144
Miscellaneous.....	...	168	...	19	4	149	5	567	...	48	3	7	...	297	12	1,255
Total.....	1	222	1	35	6	251	10	628	...	88	3	15	1	336	22	1,575
Grand total for 1934.....	32	1,554	2	281	13	423	32	1,913	1	311	15	138	28	1,446	123	6,066
Grand total for 1933.....	12	783	...	208	8	349	25	1,513	4	267	6	169	14	1,061	69	4,350

*Data for Manitoba not available.

SPECIAL REPORT ON THE CONSUMPTION OF SUP
TABLE 32.—*PURCHASES OF MINING AND MILLING EQUIPMENT, GE
BY THE ENTIRE CANADIAN

	Nova Scotia
	\$
Belting of all kinds, including elevator, conveyor, transmission, etc., and fasteners for same.....	34,093
Boits, nuts, rivets, studs, washers, coach, set and machine screws, etc.....	64,916
Castings:—unfinished iron and steel.....	43,665
Unfinished brass castings; brass and copper rods and sheets, babbitt and non-ferrous metals of all kinds..	20,876
Cars and locomotives and mechanical parts for same.....	293,295
Track materials:—rails and fittings, switches, spikes, bolts, etc.....	139,414
Explosives:—powder, fuse and detonators.....	252,538
Rock drills and parts.....	25,721
Drill and tool steels.....	9,396
Pipe and fittings, plumbing supplies and valves.....	228,283
Well casings.....	
Iron and steel bars, sheets, plates, and all structural steel.....	145,155
Wire rope and fittings.....	180,458
Diamonds and bort for drilling.....	
Safety equipment and apparel:—Safety hats, boots, gloves, goggles, respirators, etc; miners' lamps and accessories and lamp rentals.....	71,200
Fuel:—coal, coke, charcoal and wood.....	55,435
Fuel oil, kerosene, and gasoline.....	53,638
Lubricants:—oil, grease, and waste.....	92,381
Lumber and timber of all kinds.....	655,152
Building materials:—cement, brick, tile, roofing and building paper, insulating material, building hardware, glass, putty, paints, varnishes and brushes, wood screws, nails, screw hooks and eyes, sand, lime, and miscellaneous.....	101,551
Electrical equipment and supplies:—motors, batteries, wire and cable, etc.....	199,611
Crushing, grinding and screening machinery and parts; ball and tube mill liners, roll shells, etc.....	23,070
Filter cloth, rotor covers and ore dressing blankets.....	20
Balls and rods for grinding.....	1,568
Machinery, mill, n.o.p. and parts.....	14,881
Machinery, mine, n.o.p., and parts:—steel shop equipment, hoists, mine pumps, etc.....	97,077
Machinery, smelter, n.o.p., and parts.....	
Machinery, miscellaneous, and parts: machine, blacksmith, carpenter shop and general surface equipment	59,804
Motor cars, trucks and accessories.....	19,267
Tools:—brooms, picks, shovels, hammers, handles, saws, wrenches, machinists' tools, etc.....	23,582
Welding and cutting equipment and accessories:—oxygen, acetylene welding, rods, tips, etc.....	23,877
Rubber goods, suits, boots, hose and accessories, pump valves, launder linings, etc. (not including belts).	18,410
Flotation reagents.....	
Cyanide and cyanide plant chemicals.....	3
Acids and chemicals, n.o.p.....	1,442
Refractories:—brick, cement, fireclay, etc.....	19,306
Smelter fluxes:—fluorspar, limestone, quartz, sand, etc.....	150
Hospital equipment and medical supplies.....	3,831
Stationery, office equipment and supplies, survey and drafting equipment and supplies.....	34,775
Miscellaneous materials, n.o.p. Includes all materials NOT OTHERWISE PROVIDED FOR in any other item.....	225,344
Power—electric.....	1,007,449
Freight (a) incoming—only amounts paid direct to Railway Company.....	185,129
(b) outgoing.....	125,876
Express (a) incoming—only amounts paid direct to Express Company.....	4,164
(b) outgoing.....	377
Insurance (a) Fire.....	38,149
(b) Sickness and accident.....	29
(c) Group.....	1,451
(d) Workmen's compensation.....	458,379
(e) Bullion.....	40
(f) Other.....	35,373
Added Items for Coal Mining Industry—	
(a) Underground mine cars.....	111,992
(b) Coal cutting machinery and parts.....	159,084
(c) Horses and horse-keep (includes the purchase of horses, oats, hay, mixed feeds, harness, etc.)....	88,150
(d) Ground limestone for dusting.....	39,203
Total.....	\$ 5,488,030

* Compiled from data received from 629 companies. The survey is not entirely comprehensive, since it was found impracticable to collect or obtain returns from individuals or companies whose records were either incomplete or entirely lacking. Then again, returns were not generally obtainable from prospectors or syndicates whose operations were of an exploratory nature and conducted in isolated or remote regions and whose expenditures would amount to a considerable sum in the aggregate.

PLIES BY THE CANADIAN MINING INDUSTRY, 1934

NERAL SUPPLIES, AND FREIGHT AND INSURANCE EXPENDITURES,
MINING INDUSTRY, IN 1934

New Brunswick	Quebec	Ontario	(a) Manitoba and Saskatchewan	Alberta	British Columbia and Yukon	Canada
\$	\$	\$	\$	\$	\$	\$
718	58,817	106,027	15,800	9,528	79,656	304,639
1,246	166,589	111,922	20,067	11,604	118,251	494,615
286	28,273	131,081	16,134	11,139	103,662	334,240
150	55,700	57,393	26,711	2,716	317,587	481,133
.....	39,565	290,375	29,395	21,098	106,665	789,393
2,993	52,323	262,256	51,903	22,346	74,482	605,717
14,395	725,179	2,708,440	316,479	112,638	1,183,263	5,310,932
196	143,004	569,407	67,700	13,559	230,420	1,050,007
73	76,234	399,993	27,214	61,158	84,375	658,443
1,072	183,878	789,883	87,006	118,589	256,670	1,665,381
.....	.....	47,876	.....	252,730	.....	300,606
510	269,475	846,572	113,057	48,585	338,512	1,761,866
2,514	39,215	193,671	46,570	63,776	180,414	706,618
.....	21,677	124,133	5,903	234	5,203	157,150
.....
2,339	23,785	140,607	15,254	21,488	169,138	443,811
6,787	1,249,518	3,933,760	229,102	16,551	1,663,663	7,154,816
2,901	293,561	684,202	49,729	41,859	390,426	1,516,316
2,682	74,577	216,489	57,063	65,338	142,688	651,218
40,132	245,910	2,352,472	106,413	325,848	427,688	4,153,615
.....
4,167	248,599	637,166	58,468	51,156	336,636	1,437,743
5,285	422,069	919,161	172,434	51,397	572,963	2,342,920
1,295	255,679	644,198	80,027	5,547	265,334	1,275,150
.....	12,280	135,471	11,669	2,203	41,620	203,263
.....	103,581	728,480	89,337	.....	143,669	1,066,635
932	336,496	754,430	111,074	3,230	317,094	1,538,137
10,660	314,557	581,021	171,544	224,494	366,904	1,766,257
.....	85,746	601,205	19,936	.....	24,395	731,282
10,701	199,775	535,054	52,127	149,810	252,706	1,259,977
525	42,509	137,070	22,126	45,368	140,225	407,090
1,973	51,780	181,370	43,620	19,895	231,135	553,355
841	37,989	117,922	25,603	11,436	37,640	255,308
723	44,591	156,280	20,742	5,943	139,556	386,245
.....	182,965	253,817	180,452	.....	270,371	887,605
.....	38,490	710,923	144,998	.....	65,665	990,079
165	38,321	284,337	19,136	7,606	101,813	452,820
120	164,550	547,697	45,823	6,251	83,913	867,660
.....	10,702	1,283,633	91,873	.....	122,847	1,509,205
100	4,042	26,501	1,537	1,684	20,711	58,406
3,448	58,465	160,661	22,466	28,666	76,433	384,914
.....
1,000	702,347	1,093,737	883,768	185,065	726,782	3,818,043
15,736	1,345,764	4,075,773	131,094	186,310	2,377,384	9,139,510
12,957	775,332	4,590,675	463,118	116,139	2,307,888	8,456,238
31,721	102,977	469,155	467,073	275,533	1,858,959	3,331,294
967	11,931	106,136	2,191	6,771	17,024	149,184
368	12,326	63,883	6,938	764	27,533	112,189
3,809	155,144	310,141	60,281	102,380	167,844	837,748
.....	4,555	36,943	1,193	5,432	2,001	50,153
355	28,674	127,298	1,202	17,951	76,350	253,281
30,463	163,845	766,212	124,815	259,475	357,960	2,161,149
.....	4,446	47,021	984	.....	6,747	59,238
.....	8,016	22,218	10,863	12,710	94,120	183,300
.....
5,936	.....	.....	3,533	40,282	189	161,932
16,754	.....	.....	1,699	78,318	12,243	268,098
2	.....	.....	12,011	70,548	11,473	182,184
.....	.....	.....	365	2,386	1,703	43,657
.....
239,997	9,713,823	35,072,148	4,842,640	3,195,534	17,539,593	76,082,765

(a) Since the operations of one large mining and smelting company are conducted on the Interprovincial boundary, it was necessary to combine the statistics for Manitoba and Saskatchewan.

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

(With tables showing the production of gold)

General Review

CANADA

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is named “The Auriferous Quartz Mining Industry” and in which industry the gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian gold mining industry.

Historical.—The early history (1850-1895) of gold production in Canada is largely confined to the placer operations of the pioneer prospector in British Columbia and it was from this source that most of the metal was derived until the discovery, in 1896, of the extremely rich gravels of the Klondike river in the Yukon Territory, between 1898 and 1905 gold to the value of more than \$100,000,000 (4,838,000 fine ounces) is stated to have been obtained from the placers of the Bonanza, Eldorado, Hunker, Dominion and Sulphur Creeks. Almost coincident with this western activity was witnessed the Lake of the Woods discoveries in Ontario and renewed activity on the Nova Scotia quartz veins. The past fifteen to twenty years, although witnessing a decline in the alluvial gold industry, have given to the nation the highly productive auriferous quartz mines of the Porcupine and Kirkland Lake camps in Ontario and of the Portland Canal and Bridge River districts in British Columbia. The base metal mining industries are now contributing important and increasing quantities of gold to Canada’s total production. This has been mostly highly reflected in the growing gold production originating in the recent expansion in copper-nickel and copper-gold mining industries; this increase is strikingly exemplified in the recovery of the metal as the result of extensive mining and metallurgical developments at the Noranda copper mine in the province of Quebec, the Frood mine in the Sudbury area of Ontario and the Flin Flon mine in Manitoba.

Sources.—The greater part of the gold production of Canada comes from the Canadian shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of the MacKenzie River. The area of the shield is roughly 1,825,000 square miles, almost half of Canada—the precambrian shield is not only our present greatest reservoir of the precious metal, but in all probabilities the most fruitful region for discovery of new deposits.

Production of new gold from all sources in Canada during 1934 amounted to 2,972,074 fine ounces, valued at \$61,438,220 as compared with an output of 2,949,309 fine ounces, valued at \$60,967,626 in 1933 and 3,044,387 fine ounces worth \$62,933,063 in 1932, (gold valued at \$20·671834 per fine ounce). The quantity of metal recovered in 1934 represents only an increase of ·8 per cent over the preceding year, however, the value of production, in Canadian funds, realized a 21·6 per cent gain over that for 1933.

The 1934 output originated as follows: gold contained in crude bullion made at gold mines, 2,335,132 fine ounces; alluvial gold, 59,284 fine ounces; gold in blister and anode copper and in base bullion made at Canadian smelters, 434,635 fine ounces; and the estimated recovery of gold in ores, matte, slags, residues and concentrates exported to foreign metallurgical plants, 143,023 fine ounces.

Of the total Dominion output, Nova Scotia contributed 3,525 fine ounces; Quebec, 390,097 fine ounces; Ontario, 2,105,339 fine ounces; Manitoba, 132,321 fine ounces; Saskatchewan, 5,405 fine ounces; Alberta, 393 fine ounces; British Columbia, 296,196 fine ounces and the Yukon Territory, 38,798 fine ounces.

Importance of the Industry and Recent Gold Legislation.—Practically all of Canada's gold bullion is shipped by the mines to the Royal Canadian Mint at Ottawa. Up until April 19th, 1933, Canada shipped refined gold to New York accepting payment in United States funds at the coinage value, later after April 19th, on which date the United States went off the gold standard, this gold was consigned to London. The present practice, as that prevailing throughout 1934, is to ship gold to the most advantageous market, either London or New York. During the earlier movements of gold to New York the mining companies were paid a premium on the net value of their gold at a rate equivalent to the exchange premium in United States funds on the date of deposit of the gold at the Mint. After April 19th, 1933, the Mint paid the producer the standard rate per fine ounce, less charges for melting, assaying and refining, and when the gold was sold in a foreign market the difference between the standard rate and the net amount realized, was returned to the producer or shipper. The average price in Canadian funds of gold in 1934, based on the average prices paid by New York or London, was \$34.50 as against \$28.60 in 1933 or in other words the value of the 1934 Canadian gold production amounted, in Canadian funds, to \$102,536,553 as against \$84,350,237 in 1933.

The more outstanding events associated with the recent rise in price of gold include the suspension of specie payments by Great Britain on September 21, 1931; the direct control and licensing of Canadian gold exports by the Canadian Government; the purchase by the Canadian Government of all new gold bullion produced in the Dominion with the payment to the miner of equalization exchange; the departure of the United States from the gold standard on April 19th, 1933, and the announcement of January 31st, 1934, by President Roosevelt, that thereafter the United States Treasury would purchase gold from any quarter at not less than \$35.00 per fine ounce and would be empowered by United States Congress to offer, if necessary, up to \$41.34 an ounce. The weight of the new United States gold dollar is 15.5/21 grains, nine-tenths fine, as compared with the former gold dollar of 25.8 grains, nine-tenths fine. The new dollar contains 1/35 of an ounce of gold and an ounce of fine gold is equivalent to \$35.00.

The increase in the price of gold is reflected in an almost general expansion in the Canadian gold mining industry, in the older camps the economic mining of lower grade materials has resulted in a very large increase in ore reserves while deposits in other areas previously considered of little commercial importance have been developed and brought into production. Prospecting and exploration in both old and virgin districts have been both widespread and intensive, resulting in the discovery and development of new mines. These developments, of very great economic importance, have given to gold mining a status comparable with those of the great basic industries of the nation. The economic importance of primary gold production to the Dominion may be better appreciated when it is stated that, in the preliminary estimate by the Bureau of Statistics of the balance of International Payments for Canada in 1934, the net value of gold exports was surpassed only by the favourable balance of exports in the entire commodity trade of the Dominion, the favourable balance of \$145,000,000 in the entire commodity trade being raised to \$239,200,000 when the balance of gold exports is included. Again the net value of gold exports equalled 41 per cent of the net interest and dividend payments to foreign holders of Canadian securities, whether government, municipal or corporation and were \$19,200,000 in excess of the Dominion's requirements to meet its capital payments on maturing bonds. It is also interesting to note that the value of Canadian gold production per capita has increased within the last decade from \$3.86 in 1925 to \$9.45 in 1934.

According to the Department of Mines, Ottawa, a decided impetus will be given to Canadian gold development as a result of the \$1,000,000 Dominion Government program of geological field work undertaken during the 1935 season. The attention of the 180 parties placed in the field focussed mainly on areas where the geological occurrences were believed to be favourable to gold deposition. The program constituted the most ambitious effort ever undertaken by the Dominion Government toward assisting the prospector and engineer in the search for new sources of mineral wealth.

The Special War Revenue Act was amended in April 1934 to provide for a tax on newly mined Canadian gold. It was felt that the unusually prosperous condition of the gold mining industry due to the rise in price of gold from \$20.67 per ounce to about \$35.00 per ounce provided a basis for a gold tax. The increase in the price of gold in terms of the Canadian dollar resulted from national and international monetary policies.

The tax as finally approved by Parliament provided that mines that had paid dividends in the calendar years 1932 and 1933 were to pay a tax of 25 per cent of the premium value of the gold deposited for sale at the Royal Canadian Mint or exported under licence. The tax was not to operate to reduce the amount received by the mine below \$30.00 per ounce.

Against the tax collected, the tax-paying mines were allowed a deduction of an amount equal to the income tax payable by them for the year 1934, or, in those cases where the mine's fiscal year did not coincide with the calendar year, an amount equal to the income tax attributable to the calendar year 1934. The tax came into force on April 19, 1934, and was to continue until May 31, 1935.

In the Budget Speech of March 22, 1935, the Minister of Finance stated that the gold bullion tax would not be continued after May 31, 1935, and that important changes would be made in the depletion allowances allowed for Income Tax purposes to gold and silver mines. In future the allowance for depletion to mining companies, the principal product of which is gold or silver, is to be $33\frac{1}{3}$ per cent instead of 50 per cent. Furthermore, dividends received by shareholders are now to be taxed on the basis of a 20 per cent depletion allowance instead of 50 per cent as formerly.

Royal Canadian Mint.—The Ottawa Mint, established as a branch of the Royal Mint under the (Imperial) Coinage Act, 1870, and opened on January 2, 1908, was by 21-22 Geo. V, c. 48, constituted a branch of the Department of Finance and since December 1, 1931, has operated as the Royal Canadian Mint. The great development of the gold mining industry in Canada has resulted in gold refining becoming one of the principal activities of the Mint. Gold coins have never been a popular medium of exchange in Canada and have not been struck since 1919, most of the fine gold produced from the rough shipments from the mines being delivered to the Department of Finance in the form of bars, the rest being sold in convenient form to manufacturers. The fine silver extracted from the rough gold, when not required for coinage, is sold on the New York market or disposed of to local manufacturing firms.

The domestic gold currency of Canada, as at present authorized by the Currency Act, consists of \$20, \$10, \$5 and $2\frac{1}{2}$ gold pieces, 900 millesimal fineness (only \$10 and \$5 pieces have been issued). Gold was used only to an insignificant extent as a circulating medium in Canada, its monetary use being practically confined to reserves; \$5 and \$10 gold pieces weighing respectively 129 and 258 grains, $9/10$ ths pure gold by weight, have been coined, the Canadian gold dollar thus containing 23.22 grains of pure gold. The \$5, \$10 and \$20 gold coins of the United States, which contain exactly the same weight of gold as Canadian gold coins of these denominations, are legal tender for their face value only, as are the British sovereigns, which are legal tender for \$4.86 $\frac{2}{3}$; their equivalent in Canadian gold dollars.

The regulations in part for the receipt of gold bullion at the Royal Canadian Mint, Ottawa, are as follows:—Each parcel of bullion for which a separate assay is required shall be regarded as a separate deposit, and no ingot exceeding 1,500 ounces troy, gross weight, will be accepted. All deposits shall be dealt with in the order in which they are received. Deposits containing, by assay, less than 200 parts of gold in 1,000, as appearing, either before or after melting and assaying, to be unsuitable for treatment by the refining process in use, may be rejected. A deposit so rejected shall be returned to the depositor on payment by him of any costs incurred for melting and assaying.

The Mint charges, to be calculated on the gross weight of the deposit after melting, shall be as follows:—

(a) For melting and assaying—one dollar for the first four hundred ounces or part thereof, and twenty-five cents for each additional one hundred ounces or part thereof.

(b) For refining—when the deposit contains not more than 5 per cent base metal, 3 cents the ounce.

Over 5 per cent but not over 10 per cent base metal, $3\frac{1}{2}$ cents the ounce.

Over 10 per cent but not over 15 per cent base metal, $4\frac{1}{4}$ cents the ounce.

Over 15 per cent but not over 20 per cent base metal, 5 cents the ounce.

On deposits which contain over 20 per cent base metal, or which require other treatment a charge not exceeding 10 cents the ounce, to be determined by the cost of treatment.

The minimum charge for refining shall be two dollars for each deposit and the charge for refining shall apply to all deposits containing by assay less than 995 parts fine gold in 1,000.

An additional handling charge at the rate of 35 cents the ounce fine, to cover costs of realization in a market outside Canada, shall be made on all newly mined Canadian gold deposited with the Mint, and this charge shall be increased to \$1.00 the ounce fine on all other gold accepted as a deposit.

The gross value of gold deposited for sale with the Royal Canadian Mint or the Dominion of Canada Assay Office, Vancouver, shall be the market price of gold in the country to which the Government is at the time of the receipt of the deposit exporting gold, converted into Canadian funds at the average of the buying rates of exchange of that country reported to the Department of Finance by the Bank of Canada at 11 a.m. daily during the week in which the gold is deposited with the Mint or Assay office.

In addition to newly-mined Canadian gold there may be accepted at the Mint gold (over 1 ounce troy—fine) in the following forms:—old jewellery and dental scrap, provided it has not been melted or otherwise treated in any way to prevent its origin being readily recognized; scrap from manufacturers and refiners the result of processes carried out by them in the ordinary course of their business; gold coin which when full weight and fineness, is not legal tender in Canada. Satisfactory evidence as to the origin of the gold shall be furnished by the depositor if required.

Delivery of deposits shall be accepted at the Mint counter only free of all charges, and when bullion is forwarded by mail or express the original packages will not ordinarily be opened until an invoice of the description and weight of their several contents has been received. When there is a serious discrepancy between the actual and invoice weights of any deposit, further action in regard to it will be deferred pending communication with depositor.

The gross value of a deposit shall be calculated at a rate of one dollar for each 23·22 grains fine gold contained therein (equivalent to $\$20\cdot6718 +$ the ounce fine) and at a rate for all silver in excess of one per centum of the weight of the deposit after melting to be determined by the Minister of Finance—the rate to be paid for silver in any week shall be one cent below the average for that week of the daily London quotation for standard silver from Monday to Friday, inclusive, converted into the equivalent for fine silver in Canadian funds at the daily rate of exchange between Montreal and London, calculated to the nearest one-eighth of a cent.

CONCENTRATION OF NATION'S GOLD RESERVES

With the opening of the Bank of Canada on March 11, 1935, important changes took place in connection with the monetary gold reserves of the Dominion. The Dominion transferred the gold held against Dominion Notes to the Bank of Canada to an amount of \$69,455,439.44. The Dominion's liability for Dominion Notes outstanding was assumed by the Bank of Canada.

Under section 28 of the Bank of Canada Act the chartered banks were required to transfer to the Bank of Canada all gold coin or bullion owned and held in Canada. The amount transferred to the Bank of Canada was \$37,480,404.46. The gold so transferred was valued at the standard price of \$20.67 per ounce. There was provision made, however, (section 30, Bank of Canada Act) that any profits resulting from the sale by the Bank of Canada of gold coin and bullion transferred to the Bank by the chartered banks or from an increase in the value of such gold resulting from any change in the monetary standard, shall belong to the chartered banks if the Governor in Council is satisfied that the said gold was at the time of transfer being held against liabilities elsewhere than in Canada. The Governor in Council directed that 40 per cent of the gold so held was against foreign liabilities. In addition, in the case of two banks additional concessions were made on account of special deposits of gold that were ear-marked against definite external liabilities.

Thus for the first time all the gold reserves of the country are held by the one institution which will henceforth be responsible for regulating the volume of credit and currency in Canada, and for protecting the external value of the national monetary standard.

Table 33.—Production of New Gold in Canada, by Provinces and Sources, 1933 and 1934

(Gold at \$20·671834 per fine ounce)

	1933		1934	
	Fine ounces	Value	Fine ounces	Value
		\$		\$
NOVA SCOTIA—				
In gold bullion and in ores exported.....	1,382	28,568	3,525	72,868
Exchange equalization.....		10,957		48,745
QUEBEC—				
In blister copper, in ores shipped and in gold bullion.....	382,886	7,914,956	390,097	8,064,020
Exchange equalization.....		3,035,583		5,394,327
ONTARIO—				
*Porcupine area—In gold bullion.....	1,046,091	21,624,620	949,799	19,634,087
*Kirkland Lake—In gold bullion.....	1,007,036	20,817,281	988,046	20,424,723
*Other gold mines—In gold bullion.....	65,404	1,352,020	107,120	2,214,367
Copper-nickel and other ores.....	36,988	764,610	60,374	1,248,041
Total.....	2,155,519	44,558,531	2,105,339	43,521,218
Exchange equalization.....		17,089,312		29,112,977
MANITOTA—				
In gold bullion, ores shipped and in blister copper.....	125,310	2,590,388	132,321	2,735,318
Exchange equalization.....		993,478		1,829,757
SASKATCHEWAN—				
In ores shipped to Canadian smelters and crude gold to Royal Canadian Mint.....	5,400	111,628	5,405	111,731
Exchange equalization.....		42,812		74,741
ALBERTA—				
In alluvial gold.....	324	6,698	393	8,124
Exchange equalization.....		2,569		5,434
BRITISH COLUMBIA—				
In alluvial gold.....	19,142	395,700	20,145	416,434
In gold bullion.....	122,293	2,528,021	153,173	3,166,367
In blister copper.....	8,667	179,163	6,063	125,333
In base bullion and in matte and ores exported.....	88,893	1,837,581	116,815	2,414,781
Total.....	238,995	4,940,465	296,196	6,122,915
Exchange equalization.....		1,894,792		4,095,847
YUKON—				
In alluvial gold.....	39,174	809,798	38,703	800,062
In ores exported.....	319	6,594	95	1,964
Total.....	39,493	816,392	38,798	802,026
Exchange equalization.....		313,108		536,505
Total for Canada.....	2,949,309	60,967,626	2,972,074	61,438,220
Estimated exchange equalization on gold produced.....		23,382,611		41,098,333
Grand Total Value, including exchange equalization.....		84,350,237		102,536,553

*Includes small amounts of gold contained in slags, etc.

In 1933 the estimated average price of a troy ounce of fine gold in Canadian funds was \$28.60, in 1934 the corresponding price was \$34.50.

Table 34.—Production of Gold in Canada by Principal Mines, 1934

Property	Ore raised	Ore treated	Gold† recovered	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
NOVA SCOTIA—					
Beacon Gold Mines.....	51	51	25	10	(a)
Corwin Gold Mines.....	150	50	7		(a)
Ross Mine (Cons. M. & S. Co.).....	871	871	377	20	(a)
Banook Mining Co.....	230	230	108	24	(a)
Guysboro Mines Ltd.....			31	50	(a)
Higgins & Lawlor (Moose River).....	963	649	285	15	(a)
Lacey Gold Mining Co. Ltd.....	1,000	240	(d)	35	
Montague Gold Mines Ltd.....	13,088	8,549	1,681	50	(a) (c)
Seal Harbour Gold Mines Ltd.....	3,732	3,732	662	25	(a)
MacDonald Hudson Gold Mines.....	313	313	41	20	(a)
United Goldfields of N.S. (Brookfield).....	2,282	2,282	117*	25	(a) (c)
Other producers.....	†	†	191	†	†
Total Nova Scotia.....			3,525		

Table 34.—Production of Gold in Canada by Principal Mines, 1934—Continued

Property	Ore raised	Ore treated	Gold† recovered	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
QUEBEC—					
Beattie Gold Mines Ltd.	360,900	359,200	52,240	1,200	(b) (c)
Bussières Mining Co. Ltd.	55,879	38,047	5,039	190	(a) (c)
Granada Gold Mines Ltd.	36,266	35,424	6,864	100	(a) (b) (c)
Green Stabell Mines Ltd.	23,003	21,583	5,682	100	(a) (b) (c)
La Mine D'Or Venus Cons.	60	60	8	25	(c)
McWatters Gold Mines Ltd.	5,713	5,081	2,961	50	(c)
O'Brien Gold Mines Ltd. (e)	26,743	27,832	7,626	80	(a) (c)
Perron Gold Mines Ltd.	5,047	2,646	5,392	25	(a)
Siscoe Gold Mines Ltd.	124,846	124,151	63,394	340	(a) (b)
Sullivan Cons. Mines Ltd.	7,278	7,960	4,062	50	(a) (b)
Placer mines.	†	†	43	†	†
Copper-gold mines.			241,786		(c)
Total Quebec.			390,097		
ONTARIO—					
Porcupine Camp—					
Anglo-Huronian Ltd. (Vipond)	101,799	101,806	15,541	300	(b)
Buffalo Ankerite Gold Mines.	125,134	125,134	20,603	350	(b)
Blue Quartz Mine (Amalg. Gold Fields)	dump	500	19	25	(b)
Coniaurum Mines Ltd.	138,114	138,114	28,436	500	(b)
Dome Mines Ltd.	547,600	547,600	206,158	1,500	(a) (b)
Hollinger Cons. Gold Mines Ltd.	1,900,341	1,900,490	434,257	6,000	(b)
Marbuan Gold Mines Ltd.	26,030	26,030	3,304	150	(b)
McIntyre Porcupine Mines Ltd.	851,345	851,345	239,099	2,000	(b) (c)
McLaren-Porcupine Gold Mines Ltd.	50	50	10	3-5	(a)
Munro-Croesus Gold Mines Ltd.	180	205	298	15	(a)
Paymaster Cons. Mines Ltd.	11,572	13,824	2,020	500	(b)
Miscellaneous.	†	†	54	†	†
Total Porcupine Camp.		3,705,098	949,799		
Kirkland Lake Camp—					
Barry-Hollinger Mines Ltd.	33,445	33,445	4,399	100	(b)
Bidgood Kirkland Gold Mines Ltd.	2,560	2,433	199	15	(b)
Kirkland Lake Gold Mining Co. Ltd.	64,952	64,952	20,316	170	(b) (c)
Lake Shore Mines Ltd.	836,023	836,023	471,762	2,300	(b)
Macassa Mines Ltd.	63,057	66,557	32,056	200	(b)
Moffat Hall Mine.	8,476	8,476	2,525		(b) (*)
Sylvanite Gold Mines Ltd.	111,767	111,767	50,337	350	(b)
Teck-Hughes Gold Mines Ltd.	442,745	442,745	167,412	1,300	(b)
Toburn Gold Mines Ltd.	36,230	36,230	20,401	100	(b)
Wright-Hargreaves Mines Ltd.	354,418	354,418	218,203	900	(b)
Miscellaneous.	†	†	436	†	†
Total Kirkland Lake.		1,957,046	988,046		
Other gold mines—					
Algoma Summit Gold Mines Ltd.	†	421	144	‡	(a)
Ardeen Gold Mines Ltd.	†	38,143	5,815	200	(b)
Ashley Gold Mining Corp.	43,532	43,532	13,181	150	(b) (c)
Casey Summit Gold Mines Ltd.	†	4,094	888	50	(a)
Central Canada Mines Ltd.	200	350	21	12	(a) (m)
Central Patricia Gold Mines Ltd.	11,680	11,536	6,373	50	(b)
Dikdik Exploration Co. Ltd.	803	230	1,082		(c)
Duport Mining Co. Ltd.	†	25	65		(c)
Howey Gold Mines Ltd.	477,044	481,757	45,985	1,100	(b)
J. M. Cons. Gold Mines Ltd.	†	3,443	1,019	25	(a) (b)
Little Long Lac Gold Mines Ltd.	5,600	5,485	2,457	175	(a) (b)
McMillan Gold Mines Ltd.	12,313	12,313	1,959	100	(b)
Matatchewan Cons. Mines Ltd.	10,605	4,680	679	100	(b)
Minto Gold Mines Ltd.	22,189	22,189	4,912	90	(b)
Northern Empire Mines Co. Ltd.	22,759	22,507	5,663	90	(a) (b)
Parkhill Gold Mines Ltd.	19,455	19,431	8,984	75	(b)
St. Anthony Gold Mines Ltd.	5,626	(j) 37,610	3,571	125	(b)
Sol D'Or Gold Mines Ltd.	130	130	74	3	(a)
Young-Davidson Mines Ltd.	51,842	51,842	3,878	600	(b)
Miscellaneous.			370		
Total Other Ontario Gold Mines.		759,718	107,120		
Copper-Nickel mines.			60,374		(c)
Grand Total Ontario.			2,105,339		
MANITOBA—					
Central Manitoba Mines Ltd.	48,406	43,862	12,560	150	(a) (b) (c)
Diana Gold Mines Ltd.	6,663	5,284	1,980	30	(a)
Island Lake Mines Ltd.	9,191	6,984	3,231	50	(a) (c)
Oro Grande Development Co. Ltd.	†	†	146	75	(a)
San Antonio Gold Mines Ltd.	66,457	64,294	21,638	225	(a) (b)
Copper-Gold ores and miscellaneous.			92,766		
Total Manitoba.			132,321		

Table 34.—Production of Gold in Canada by Principal Mines, 1934—Concluded

Property	Ore raised	Ore treated	Gold† recovered	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
SASKATCHEWAN—					
Copper-Gold ores.....			5,405		
ALBERTA—					
Placer gold.....			393		
BRITISH COLUMBIA—					
Bralorne Mines Ltd.....	98,664	98,664	45,971	450	(a) (c)
Bunker Hill Gold Mines Ltd.....	†	(h) 92	56		(c)
Cariboo Gold Quartz Mining Co. Ltd.....	28,447	27,693	10,263	100	(b)
Carmi Gold Mines Ltd (3).....	165	(h) 165	86		(c)
Clubine Comstock Gold Mines Ltd.....	102	(h) 102	116		(c)
Columario Cons. Gold Mines Ltd.....	2,300	2,300	483	90	(c)
Danzig Mines Ltd.....	33	(h) 33	67		(c)
Dawson Cons. Gold Mines Ltd.....	†	(h) 8	67	25	(a) (c)
Dentonia Mines Ltd.....	22,610	22,464	3,784	135	(c)
Dynamo Mining & Milling Co. Ltd.....	56	(h) 56	20		(c)
Euphrates Mining Co., Ltd.....	58	(h) 58	100		(c)
Evening Star.....	197	(h) 198	230		(c)
Gold Belt Mining Co. Ltd.....	†	(h) 291	608		(c)
Granby Point Mine.....	†	13,948	1,357		(c)
Grandoro Mines Ltd.....	3,000	(h) 546	576x		(c)
Grange Mines Ltd.....	3,330	3,330	545	50	(a) (c)
Hercules Cons. Mining, S. & P. Corp.....	18	(h) 18	31x		(c)
Island Mountain Mines Co. Ltd.....	2,894	2,894	1,591	50	(b)
I. X. L. Mine.....	127	(h) 127	748		(c)
Jenny Long Gold Mines.....	200	100	†	30	(c)
Keystone Mine.....	†	(h) 105	142		(c)
Kootenay Belle Gold Mines Ltd.....	2,824	(h) 824	1,529	60	(c)
Livingstone Mining Co. Ltd.....	563	(h) 563	436		(c)
Midnight Mine.....	266	(h) 266	153		(c)
Minto Gold Mines Ltd.....	2,878	1,439	345	50	(a) (c)
Morning Star Gold Mines Ltd.....	2,652	(h) 2,652	1,444		(e)
Nicola Mines & Metals Ltd.....	6,095	6,095	775	50	(c)
Noble Fine Mines Ltd.....	164	(h) 164	175		(c)
Oscarson Bros. (Erie).....	408	(h) 408	507		(c)
Pioneer Gold Mines of B.C. Ltd.....	130,066	130,198	87,536	300	(b)
Precambrian Gold Mines.....	3,154	3,100	1,178	25	(c) (i)
Premier Gold Mining Co. Ltd.....	154,693	154,693	38,371	500	(c)
Relief-Arlington Mines Ltd.....	14,614	11,663	5,787	25	(a) (c)
Reno Gold Mines Ltd.....	26,895	26,895	15,979	100	(a) (b) (c)
Superior Gold Mines Ltd.....	3,415	3,415	57	50	(c)
Surf Point Mine (N.A. Timmins).....	7,814	5,658	3,582	20	(c)
Taylor Windfall Mining Co. Ltd.....	83	83	185x	5	(a)
Twin Lakes Gold Mining Co. Ltd.....	5,471	5,471	1,675	40	(a) (c)
Union Mine (J. F. McCarthy).....	†	(j) 18,143	424	200	(b) (c)
Vancouver Island Gold Mines Ltd.....	40	(h) 40	116		(c)
Velvet Gold Mining Co.....	2,000	740	747	50	(c) (k)
Vidette Gold Mines Ltd.....	7,228	7,216	3,589	30	(c)
Waterloo Gold Mines Ltd.....	†	(h) 59	54		(c)
Wayside Cons. Gold Mines Ltd.....	2,381	513	84	40	(a)
Wilcox Mine.....	3,320	1,660	651	20	(a) (c)
Windpass Gold Mining Co. Ltd.....	9,005	11,316	7,819	40	(c) (k)
Ymir Cons. Gold Mines Ltd.....	3,677	(h) 4,261	2,254	(l) 100	(c)
Ymir Dundee Gold Mining Co. Ltd.....	313	(h) 313	113		(c)
Ymir Yankee Girl.....	†	(h) 13,966x	(h) 9,104x	(l) 100	(c)
Placer mines.....			20,145		
Copper-gold, silver-lead and other gold mines.....			24,541		
Total British Columbia.....			296,196		
YUKON—					
Placer.....			38,703		
Other sources.....			95		
Total Yukon.....			38,798		
Total Canada.....			2,972,074		

NOTE.—

- (a) Amalgamation.
 (b) Cyanidation.
 (c) Shipments to smelter.
 (d) No clean up.
 (e) Includes O'Brien & Fowler.
 (f) Cyanided.
 (g) Includes tailings, etc.

- (h) Shipped.
 (i) Also includes bullion.
 (j) Tailings.
 (k) Includes ore and concentrates.
 (l) Under construction.
 (m) Concentrates also produced.

† Output reported by mines producing crude gold bullion represents fine gold contained in bullion or other material shipped.

* Subject to revision.

† Information not available.

Table 35.—Production of Gold in Canada, 1925-1934

Year	Fine ounces*	Value	Year	Fine ounces*	Value
		\$			\$
1925.....	1,735,735	35,880,826	1930.....	2,102,068	43,453,601
1926.....	1,754,228	36,263,110	†1931.....	2,693,892	55,687,688
1927.....	1,852,785	38,300,464	†1932.....	3,044,387	62,933,063
1928.....	1,890,592	39,082,005	†1933.....	2,949,309	60,967,626
1929.....	1,928,308	39,861,663	†1934.....	2,972,074	61,438,220

Note.—For years 1858 to 1924, see previous reports.

* Calculated from the value \$1=0.048375 ounces.

† Value of gold in Canadian dollars, 1931—\$ 58,093,396.

† Value of gold in Canadian dollars, 1932—\$ 71,479,373.

† Value of gold in Canadian dollars, 1933—\$ 84,360,237.

† Value of gold in Canadian dollars, 1934—\$102,556,553.

Table 36.—Quantity and Value of Gold produced in Canada, by Provinces, 1925-1934

(For the years 1862 to 1924, see Mineral Production of Canada, 1928)

Year	Nova Scotia			Quebec		
	Fine oz.	Statutory value \$	Value in Canadian dollars \$	Fine oz.	Statutory value \$	Value in Canadian dollars \$
1925.....	1,626	33,612		1,602	33,116	
1926.....	1,678	34,687		3,680	76,072	
1927.....	3,151	65,137		8,331	172,217	
1928.....	1,290	26,667		60,006	1,240,434	
1929.....	2,687	55,545		90,798	1,876,961	
1930.....	1,272	26,295		141,747	2,930,170	
1931.....	460	9,509	9,920	300,075	6,203,101	6,471,075
1932.....	964	19,928	22,634	401,105	8,291,576	9,417,572
1933.....	1,382	28,568	39,525	382,886	7,914,956	10,950,539
1934.....	3,525	72,868	121,613	390,097	8,064,020	13,458,347

Year	Ontario			Manitoba		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1925.....	1,461,039	30,202,357		4,424	91,452	
1926.....	1,497,215	30,950,180		188	3,886	
1927.....	1,627,050	33,634,108		182	3,762	
1928.....	1,578,434	32,629,126		19,813	409,571	
1929.....	1,622,267	33,535,234		22,455	464,186	
1930.....	1,736,012	35,886,552		23,189	479,559	
1931.....	2,085,814	43,117,600	44,980,280	102,969	2,128,558	2,220,512
1932.....	2,280,105	47,133,952	53,534,743	122,507	2,532,444	2,876,350
1933.....	2,155,619	44,558,351	61,647,843	125,310	2,590,388	3,583,866
1934.....	2,105,339	43,521,218	72,634,195	132,321	2,735,318	4,565,075

Year	Saskatchewan			Alberta		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1925.....						
1926.....						
1927.....				42	868	
1928.....				68	1,406	
1929.....				5	103	
1930.....						
1931.....				195	4,031	4,205
1932.....	11	227	258	83	1,716	1,949
1933.....	5,400	111,628	154,440	324	6,698	9,267
1934.....	5,405	111,731	186,472	393	8,124	13,558

Year	British Columbia			Yukon		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1925.....						
1926.....						
1927.....						
1928.....						
1929.....						
1930.....						
1931.....						
1932.....						
1933.....						
1934.....						

Table 37.—Total Gold Production in Ontario*

Year	Total production	Porcupine belt		Kirkland Lake belt		N.W. Ontario (c)	
	\$	\$	per cent	\$	per cent	\$	per cent
1866-1891.....	1190,258						
1892-1909.....	12,509,492						
1910.....	68,498	35,539	51.8				
1911.....	42,637	15,437	36.2				
1912.....	2,114,086	1,730,623	81.8				
1913.....	4,558,518	4,294,113	94.1	86,316	1.9		
1914.....	5,544,979	5,206,006	93.8	114,154	2.0		
1915.....	8,501,391	7,462,111	88.6	551,069	6.5		
1916.....	10,339,259	9,391,408	90.8	702,761	6.8		
1917.....	8,698,735	8,229,744	94.5	404,346	4.6		
1918.....	8,502,480	7,767,907	91.4	632,097	7.4		
1919.....	10,451,709	9,941,803	95.1	486,809	4.7		
1920.....	11,686,043	10,597,572	90.7	1,033,478	8.8		
1921.....	14,692,357	13,103,526	89.5	1,524,851	10.4		
1922.....	20,579,569	18,374,658	89.3	2,159,581	10.5		
1923.....	20,136,287	17,313,115	85.9	2,719,939	13.5		
1924.....	25,669,303	22,135,534	86.2	3,446,632	13.4		
1925.....	30,206,432	24,733,120	81.8	5,385,256	17.8		
1926.....	30,950,753	23,680,670	76.5	7,174,083	23.2		
1927.....	33,627,040	23,851,857	70.9	9,674,114	28.7		
1928.....	32,629,111	20,246,319	62.0	12,233,524	37.5		
1929.....	33,535,226	19,281,286	57.6	14,046,596	41.8	22,988	0.07
1930.....	35,886,558	17,758,842	49.6	17,172,770	47.9	461,730	1.3
1931.....	43,117,615	19,891,521	46.2	21,734,729	50.4	1,007,756	2.3
1932.....	47,284,621	21,422,117	45.2	23,782,313	50.3	1,607,831	3.4
1933.....	44,558,514	21,624,617	48.5	20,817,277	46.7	1,352,017	3.0
1934.....	43,521,249	19,634,097	45.0	20,424,716	46.9	2,214,385	5.0
1935 (a).....	44,464,498	20,019,335	45.0	19,597,312	44.0	3,964,133	8.9
Total to end of 1934.....	574,067,218	367,742,882	64.1	185,904,633	32.4		

* Supplied by Ontario Department of Mines. All values given are standard.

† Estimated.

‡ Maximum yearly output was \$424,568 in 1899.

(a) Preliminary.

(c) Recent production only.

Table 38.—World Production of Gold Ore, 1932-1934

(In terms of metal)

(Supplied by Imperial Institute)

Country	1932	1933	1934	Country	1932	1933	1934
	Fine ounces	Fine ounces	Fine ounces		Fine ounces	Fine ounces	Fine ounces
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
United Kingdom.....	6	57	51	Hungary.....	2,690	3,099	2,167
Anglo-Egyptian Sudan.....	700	4,400	5,398	Sweden.....	138,631	288,643	246,687
Bechuanaland Protectorate.....	2,247	5,332	9,485	Belgian Congo.....	255,271	283,081	337,382
Gold Coast.....	278,782	305,908	326,400	Spain.....	(a)	7,716	7,596
Kenya.....	9,052	10,531	12,110	Egypt.....	18		201
Nigeria.....	2,701	17,718	37,023	Eritrea.....	1,897	3,569	(a)
Northern Rhodesia.....	6,349	2,588	2,113	French Equatorial Africa.....	15,368	26,556	29,160
Southern Rhodesia.....	574,135	642,499	691,152	French West Africa (exports).....	66,420	68,608	98,957
Sierra Leone.....	10,500	14,484	21,205	Madagascar.....	11,338	14,468	15,979
South West Africa.....	890	956	926	Mozambique.....	2,665	1,705	10,196
Swaziland.....	365	630	379	Mexico.....	584,198	637,727	661,390
Tanganyika Territory.....	25,687	32,516	42,606	United States (b).....	2,269,459	2,291,724	2,775,504
Union of South Africa.....	11,558,532	11,013,712	10,479,857	Costa Rica (c).....	8,088	2,969	13,660
Canada.....	3,044,387	2,949,309	2,972,074	Guatemala.....	10,332	(a)	(a)
Newfoundland.....	17,661	15,689	11,219	Honduras.....	16,054	17,211	12,996
British Guiana.....	13,926	23,352	25,420	Nicaragua (c).....	14,045	6,681	18,362
Federated Malay States.....	27,159	28,973	30,221	Panama (c).....	3,290	3,295	21,161
Unfederated Malay States.....	289	2,131	2,324	Salvador.....	(c) 927	(c) 2,691	6,824
India.....	329,600	336,100	322,100	Argentina (estimated).....	1,000	1,000	1,000
Sarawak.....	8,178	18,712	28,842	Bolivia.....	218	30	112
Australia.....	714,135	830,267	887,524	Chile.....	124,163	122,534	206,471
Fiji.....	311	1,844	931	Colombia.....	38,096	147,052	238,547
New Guinea (years ended June 30).....	63,485	121,913	190,000	Dutch Guiana (crude gold).....	248,249	298,243	344,310
New Zealand.....	166,354	161,755	160,248	Ecuador.....	8,064	13,378	11,896
Papua.....	9,904	9,850	12,591	French Guiana (exports).....	56,147	60,000	66,000
Uganda.....	586	1,200	5,842	Peru.....	86,101	93,775	98,850
Cyprus.....			13,092	Venezuela.....	91,534	95,720	109,055
Total.....	16,870,000	16,550,000	16,280,000	China.....	72,900	(a)	(a)
FOREIGN COUNTRIES—				Formosa.....	65,700	61,500	(a)
Czechoslovakia.....	6,544	9,836	11,990	French Indo-China.....	219	145	7,105
France.....	92,110	94,521	101,498	Japan.....	401,784	441,374	458,963
Germany.....	2,205	5,494	5,769	Korea.....	327,000	390,000	420,000
Italy.....	1,842	2,725	2,500	Netherlands East Indies.....	78,187	78,829	71,765
Yugoslavia (estimated).....	15,000	28,000	33,000	Philippine Islands.....	244,287	296,258	332,974
Roumania.....	102,591	142,585	120,016	Manchukuo.....	(a)	21,640	(a)
Norway.....			129	Cameron (French).....			450
				Total*.....	5,500,000	6,200,000	7,100,000
				World's Total*.....	22,400,000	22,800,000	23,400,000

* Excluding the production of U.S.S.R. (Russia). Owing to the wide divergences in the scattered data published (mainly relative figures) it is not possible to form any reliable estimate for the years under review, but the available information indicates that the production of that country was probably within the following ranges—

1932.....	1,500,000	—	2,000,000 fine ounces
1933.....	2,200,000	—	2,700,000 " "
1934.....	3,700,000	—	4,300,000 " "

(a) Information not available. (b) Amount recovered. (c) Imports into the United States from the country indicated.

Table 39.—Comparative Figures of Gold Production for the World Since the Discovery of America, Transvaal, United States and Canada

Period	Transvaal since the commencement of Fields (b)	*United States	Canada since the recording of Production in 1858	(a) World since the discovery of America
	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1493-1600.....				24,266,820
1601-1700.....				29,330,445
1701-1800.....				61,088,215
1801-1840.....				20,488,552
1841-1850.....		(c) 1,187,170		17,605,018
1851-1860.....			220,039	64,482,933
1861-1870.....		(d) 58,279,778	1,477,999	61,098,343
1871-1880.....		(e) 15,281,264	904,093	55,670,618
1881-1890.....	1,070,651	15,808,339	584,102	51,280,184
1891-1895.....	6,870,158	9,106,834	291,564	39,412,823
1896-1900.....	12,578,869	15,728,572	3,469,791	62,234,698
1901-1905.....	13,632,908	19,393,722	4,592,261	78,033,650
1906.....	5,792,823		556,415	19,471,080
1907.....	6,450,740		405,517	19,977,260
1908.....	7,056,266	22,993,218	476,112	21,422,244
1909.....	7,295,108		453,865	21,965,111
1910.....	7,527,108		493,707	22,022,180
1911.....	8,249,461	4,687,053	473,159	22,397,136
1912.....	9,107,512	4,520,719	611,885	22,605,008
1913.....	8,798,336	4,299,784	802,973	22,928,579
1914.....	8,394,322	4,572,976	773,178	21,875,618
1915.....	9,093,902	4,887,604	918,056	23,010,348
1916.....	9,296,618	4,479,057	930,492	22,400,370
1917.....	9,018,084	4,051,440	738,831	20,457,475
1918.....	8,418,292	3,320,784	699,681	18,701,294
1919.....	8,331,294	2,918,628	766,764	17,376,201
1920.....	8,158,226	2,476,166	765,007	16,130,273
1921.....	8,128,681	2,422,006	926,329	16,006,695
1922.....	7,009,767	2,363,075	1,263,364	15,576,270
1923.....	9,148,771	2,502,632	1,233,341	17,977,807
1924.....	9,574,918	2,528,900	1,525,382	18,667,063
1925.....	9,697,573	2,411,987	1,735,735	18,734,102
1926.....	9,954,762	2,335,042	1,754,228	19,251,794
1927.....	10,122,459	2,197,125	1,852,785	19,180,231
1928.....	10,354,157	2,233,251	1,890,592	19,399,124
1929.....	10,412,326	2,208,386	1,928,308	19,585,536
1930.....	10,716,349	2,285,603	2,102,068	20,836,318
1931.....	10,877,708	2,395,878	2,693,892	22,329,525
1932.....	11,557,858	2,449,032	3,044,387	24,150,761
1933.....	11,017,495	2,556,246	2,949,309	24,962,408
1934.....	10,486,393	2,916,373†	2,972,074	†27,339,233
Total.....	294,099,895	231,798,644	49,277,285	1,161,729,403

* Including Philippine Islands production received in United States.

† Preliminary estimate—American Bureau Metal Statistics.

(a) Supplied by United States Mint. (b) Supplied by Transvaal Chamber of Mines.

(c) 1792-1847. (d) 1848-1872. (e) 1873-1880.

Table 40.—Source of Canadian Fine Gold Production by Percentages, 1931-34

	1931	1932	1933	1934
	%	%	%	%
In alluvial gold.....	2·1	1·8	2·0	2·0
In crude gold bullion*.....	80·6	79·3	79·8	78·68
In base bullion (from silver-lead ores, etc.).....	0·6	1·0	0·7	1·09
In blister copper.....	13·8	15·1	14·2	13·41
In ores, mattes, slages, etc., exported.....	2·9	2·8	3·3	4·82
	100·00	100·00	100·00	100·00

* Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores to smelters.

Table 41.—Imports into Canada and Exports of Gold, 1933 and 1934.

	1933	1934
	\$	\$
IMPORTS—		
Coins and bullion—		
Coins, British, Canadian and foreign gold coins.....	822,236	708,010
Gold bullion in bars, blocks, ingots, drops, sheets or plates, unmanufactured.....	35,316	56,343
Total	857,552	764,353
Gold, other—		
Bullion or gold fringe.....	4,554	8,456
Manufactures of gold and silver—		
Leaf.....	52,790	61,908
Sweepings.....	4,119	140
Manufactures, n.o.p.....	17,729	23,860
Electro-plated ware.....	260,176	384,400
Gold, unmanufactured, for commercial purposes, from April 1, 1933.....	168,382	157,691
Total	507,750	636,455
EXPORTS—		
Coin and bullion—		
Gold coin—		
Canadian.....	\$ 10	
Foreign.....	\$ 5,963,594	83,480
Gold bullion—		
Canadian, n.o.p.—		
To United Kingdom.....	oz. 1,974,105	788,027
United States.....	\$ 59,925,558	26,762,697
Foreign.....	oz. 735,248	2,256,781
Foreign.....	\$ 18,019,577	78,570,316
Foreign.....	\$ 877	
Total—Canadian coin and bullion	oz. 2,709,363	3,044,808
Foreign coin and bullion	\$ 77,945,135	105,333,013
Total coin and fine gold bullion	\$ 5,964,471	83,480
Total coin and fine gold bullion	\$ 83,909,606	105,416,493
Gold-bearing quartz, dust, nuggets and crude bullion obtained direct from mining operations \$	2,299,650	3,997,992
Jewellers' sweepings (gold, silver and platinum).....	\$ 502,506	520,067
Total	\$ 2,802,156	4,518,059

Table 42.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds, 1931-1934

	1931	1932	1933	1934
	\$	\$	\$	\$
January.....	20.71	24.24	23.64	33.05
February.....	20.67	23.67	24.74	35.29
March.....	20.67	23.11	24.78	35.08
April.....	20.68	22.98	25.33	34.93
May.....	20.68	23.38	27.75	34.94
June.....	20.73	23.83	28.24	34.73
July.....	20.74	23.73	30.58	34.59
August.....	20.73	23.61	30.09	34.19
September.....	21.55	22.88	31.79	34.18
October.....	23.22	22.65	31.48	34.27
November.....	23.22	23.73	32.68	34.16
December.....	25.01	23.85	32.14	34.57
Yearly average.....	21.55	23.48	28.60	34.50

Table 43.—Gold held by the Canadian Minister of Finance, Calendar Years, 1920-1934†

Calendar Year	Gold Reserve Held on Postal Savings Bank Deposits (a)	Gold Held for Redemption of Dominion Notes	Total Gold Held by Minister of Finance
	\$	\$	\$
1920.....	4,067,897	98,751,773	102,819,670
1921.....	3,666,009	54,568,064	88,234,073
1922.....	3,293,287	59,939,108	93,232,395
1923.....	3,154,358	120,651,627	123,805,985
1924.....	3,308,575	107,257,428	110,566,003
1925.....	3,241,490	119,744,819	122,986,309
1926.....	3,162,930	109,369,550	112,532,480
1927.....	3,083,440	107,417,631	110,501,071
1928.....	2,994,001	89,218,454	92,212,455
1929.....	2,709,169	59,345,233	62,054,402
1930.....	2,483,959	79,000,297	81,484,256
1931.....	2,405,030	74,209,510	76,614,540
1932.....	2,324,246	66,854,214	69,178,460
1933.....	2,311,866	69,793,861	72,105,727
1934.....	2,257,367	70,249,952	72,507,319

†Yearly averages.

(a) In the Savings Bank Act (c. 15, R.S.C., 1927) it is provided that the Minister of Finance shall hold 10 per cent gold reserve against postal savings bank deposits.

Table 44.—Composition of Canadian Gold Reserves on December 31, 1924-1934

December 31st	British Coin	U.S. Coin	Canadian Coin	Bullion	Total
	\$	\$	\$	\$	\$
1924.....	26,342,019	77,173,105	3,327,125	34,905,387	141,747,636
1925.....	29,894,943	67,135,310	3,315,730	37,512,195	137,858,178
1926.....	32,133,941	72,423,610	3,221,930	23,415,643	131,195,124
1927.....	28,948,085	51,179,390	3,089,010	47,516,079	130,732,564
1928.....	34,163,297	31,018,970	2,931,835	25,202,771	93,316,873
1929.....	32,164,284	10,995,220	2,801,520	17,034,256	62,995,280
1930.....	30,634,058	28,748,085	2,733,150	34,096,809	96,212,102
1931.....	17,736,296	4,270,780	2,732,880	42,220,192	66,960,148
1932.....	17,638,240	4,271,355	2,704,930	48,429,889	73,044,414
1933.....	17,637,435	4,266,835	2,704,880	47,356,454	71,965,604
1934.....	17,637,445	4,266,850	2,704,865	49,291,619	73,900,779

Table 45.—World's Monetary Stocks of Gold at the Close of 1932 and 1933 (Subject to Revision)

(Compiled by United States Mint from available data)
(Stated in United States money)

Country	Total Gold Stock Value, 1932	Per capita	Total Gold Stock Value, 1933	Per capita
	\$	\$	\$	\$
United States.....	4,513,001,000	36.04	4,322,599,000	34.63
Canada.....	124,265,000	11.97	113,880,000	10.97
Belgium.....	360,842,000	44.59	379,960,000	46.56
Denmark.....	35,693,000	10.01	35,689,000	9.94
France.....	3,254,247,000	77.78	3,022,242,000	72.24
Germany.....	299,015,000	3.23	109,411,000	1.69
Great Britain.....	582,950,000	12.62	932,843,000	20.19
Italy.....	307,158,000	7.45	466,280,000	11.15
Netherlands.....	415,101,300	51.69	370,615,000	45.29
Norway.....	38,658,000	13.73	38,404,000	13.64
Poland.....	56,344,000	1.75	53,359,000	1.66
Portugal.....	28,829,000	3.54	34,080,000	5.07
Roumania.....	57,161,000	3.17	59,373,000	3.26
Russia (Soviet Union).....	(a) 367,692,000	2.26	(b) 415,622,000	2.51
Spain.....	435,904,000	18.23	436,448,000	18.52
Sweden.....	55,409,000	9.02	99,416,000	16.06
Switzerland.....	595,890,000	123.84	385,628,000	93.60
British India.....	161,933,000	0.45	164,148,000	0.46
Japan (including Chosen, Taiwan, Kwantung) (c).....	211,953,000	2.34	(c) 211,894,000	2.29
Netherland East Indies.....	41,749,000	0.68	43,568,000	0.71
Egypt.....	32,936,000	2.22	39,848,000	2.06
Australia.....	42,573,000	6.52	2,433,000	0.37
New Zealand.....	24,600,000	16.17	(f) 24,600,000	16.91
Other Countries.....	710,888,000	.....	881,386,000	.....
Total.....	12,569,791,000	(d) 6.31	12,634,726,000	(e) 6.31

(a) On August 31, 1932.

(b) On January 1, 1934.

(c) Incomplete.

(d) World population estimated at 1,981,764,000.

(e) World population principally from the U.S. Commerce Yearbook.

(f) Gold and silver.

Table 46.—Canadian Security Price Index Numbers 1929-1934

1926=100

	Common stocks		Bond yields of province of Ontario	Common stocks		
	Total	Indus- trial		Mines total	Gold	Base metals
1929						
October.....	186.4	255.4	103.3	90.1	59.3	
December.....	156.5	210.0	102.3	74.5	54.3	
1930						
December.....	103.1	120.3	93.9	59.2	57.8	
1931						
December.....	64.8	74.3	108.6	59.0	59.0	
1932						
December.....	52.2	58.9	102.7	63.1	62.7	
1933						
March.....	48.9	59.1	100.0	68.4	66.6	76.9
July.....	86.5	122.3	96.7	106.9	99.7	133.5
October.....	73.3	103.6	94.6	112.2	108.6	131.8
1934						
January.....	81.6	118.6	97.2	108.9	104.7	128.3
February.....	86.5	123.8	96.0	114.4	110.1	134.2
March.....	88.0	128.5	90.1	128.1	124.3	147.1
April.....	90.7	133.0	87.7	137.2	132.0	162.3
May.....	88.6	128.0	84.8	129.8	124.2	156.5
June.....	87.2	126.1	85.4	138.5	133.4	164.2
July.....	81.3	116.6	83.1	137.2	133.3	158.3
August.....	83.8	120.1	82.3	141.1	137.4	161.7
September.....	83.8	118.8	82.0	139.2	136.7	154.9
October.....	85.2	122.0	82.9	133.5	132.9	141.4
November.....	86.0	125.3	81.0	125.5	125.7	129.0
December.....	86.2	125.6	76.2	124.9	124.7	129.6

The relative stability of Canadian price levels in 1934 offered a marked contrast to the violent changes occurring in the preceding four years. This new movement toward equilibrium could be discerned in common stock prices, and foreign exchange, as well as in commodity markets. A pronounced rise in bond prices, indicative of a plentiful supply of investment funds, furnished the only major exception to the tendency in other price fields.

It is a striking fact that the steadiness in price levels followed closely after gold prices began to move within narrow limits at approximately 65 per cent above the former mint price of \$20.67 per ounce. The premium on gold averaged 68 per cent in February, 1934, as compared with 20 per cent in February, 1933. During the last ten months of 1934, gold prices varied less than 2 per cent, and fluctuations of the official Canadian wholesale price index were within even narrower limits. Between February, 1933, and February, 1934, wholesale prices had advanced 13.5 per cent, a much less pronounced increase than that recorded for gold.

Mining stock prices advanced rapidly during the first quarters of 1934, and were fairly steady during the second and third quarters. They declined rather sharply in October and November, but advanced moderately during December. An index of gold stock prices showed a net increase for the year of roughly 24 per cent. Gold stocks continued to advance for six months after prices for gold itself had ceased to rise, and similarly the total appreciation in gold stock prices since the mint par of \$20.67 per ounce was abandoned, has been very much greater than the currency premium established on gold. An index of base metal stock prices was 129.6 in December, as compared with 128.3 in January, and 164.2 in June, when prices were at the highest point of the year.

THE ALLUVIAL GOLD MINING INDUSTRY IN CANADA, 1934

Placer gold was reported in Canada as early as 1823 when the metal was discovered on the Chaudière river, Quebec. Later, in 1855, alluvial gold was found at the mouth of Pend d'Oreille river, B.C., by the ex-servants of the Hudson's Bay Company and by 1859 placer miners had penetrated to Cariboo and Quesnel. Later years witnessed many important discoveries of placer gold in both British Columbia and the Yukon, the most outstanding of which was the finding of the sensationally rich Klondike deposits in 1896. At the present time the greater part of the Canadian production of alluvial gold comes from the Yukon Territory and British Columbia; smaller amounts are recovered in Alberta and Quebec.

Quebec.—Placer gold production in Quebec during 1934 was confined to the counties of Compton and Beauce. In the first mentioned county small shipments of crude alluvial gold were made by the Gold River Mining Co., Ltd., from its workings in Ditton township, the property of this company was reported at the close of the year as temporarily shut down. In the Seigniory Rigaud Vaudreuil, Beauce county, the Unit Company, Ltd., was in operation from July 21 to November 1st, both underground and surface operations were conducted and a small recovery of gold reported. At St. Simon les Mines, Gilbert river, placer gold shipments were also made by Cooke and Lloyd.

Alberta.—Placer gold was discovered on the North Saskatchewan river in 1859 or 1860 and mining has been carried on, chiefly by hand methods and partly by the use of dredges, at intervals down to the present time. In 1934 the greater part of Alberta's gold production originated in the dredging operations of the McLeod River Mining Corp. Ltd. This company operated from May 1st to September 10th, 155,000 cubic yards of slough bed material being handled by the single dredge. During the year the company conducted extensive exploration of river leases and it was stated that much greater values per cubic yard, than on the beach lands were indicated with coarser gold in evidence.

British Columbia.—The British Columbia Department of Mines reports that while placer output in 1934 was approximately the same as in 1933 it is worthy to note that two larger-scale operations in the Cariboo are under way and an increase may be reasonably expected in 1935. In the Northwestern mineral survey district placer prospecting was very active but no new discoveries in new areas were made; numerous individuals, syndicates and companies were engaged and in this regard the British Columbia Department of Mines stresses that placer prospecting in this district is no easy task and requires not only experience but a grub stake and funds to see the prospector through the season in the event of failure.

A marked general increase in placer-mining activity featured the year in the Northeastern survey district. Much additional plant was installed during the year by various operators, including several drag-lines, and two small dredges of new type. Operating control of two well-known mines was secured by different English interests, the property of Consolidated Gold Alluvials of British Columbia, Ltd. (Wingdam) on the one hand, and that of Bullion Placers Ltd. (Bullion) on the other. In the Omineca Mining Division activity continued in the Manson section; in the McLeod river area operations were carried on by the Northern Reef Gold Mines Ltd., on McDougall river. Operations were also conducted in the Two Brothers Lake area this being the most northerly operation in the district and is served by aeroplanes based on Takla lake. A considerable recovery of placer gold was made by the many individual bar-workers on the Fraser and other rivers.

Yukon.—According to a report issued by the Comptroller of the Yukon Territory the amount of placer gold mined during the year ending March 31, 1935, in the Territory on which royalty export tax was paid was 48,887·45 ounces, produced as follows:—Dawson District, 47,464·90 ounces; Mayo District, 752·17 ounces; Whitehorse District, 670·38 ounces. The royalty collected was \$18,332.85. During the year six hundred and sixty-two new placer location grants were issued; ninety-seven relocation grants and 2,094 renewal grants were also issued. Two new dredging leases were issued covering twenty miles; four dredging leases were renewed covering twenty-three miles; and six hydraulic leases were renewed. This reflects the greater interest in placer mining and indicates the increase in the area of alluvial deposits now being held for development.

The Yukon Consolidated Gold Corp. Ltd., operated three electric sixteen cubic foot dredges throughout the season on hydraulic lease No. 18, on the Klondike river, one seven and one-half cubic foot dredge on Upper Dominion creek and one seven and one-half cubic foot dredge at Granville. No hydraulic operations were conducted by the company. Data pertaining to 1934 dredging operations are as follows:—

Dredge	Location	Started digging	Shut down	Cu. yds. handled
Canadian No. 2	Klondike River	May 8	Nov. 28	2,061,735
Canadian No. 3	Klondike River	May 22	Oct. 31	1,115,189
Canadian No. 4	Klondike River	May 3	Nov. 13	1,879,892
N.W. No. 1	Upper Dominion	May 16	Oct. 21	299,138
N.W. No. 2	Granville	May 11	Oct. 28	669,231

The ground ahead of Canadian No. 3 was frozen and was thawed by water points. Thawing plants were also operated ahead of Northwest dredges Nos. 1 and 2.

Reconstruction of one five cubic foot dredge and one seven and one-half cubic foot dredge was started in 1934 and will be completed in 1935.

The Holbrook Dredging Company continued operations on Sixtymile river with a steam driven dredge commencing on June 1st and continuing to November 6th, 1934. Material handled amounted to 207,216 cubic yards and 4,817.80 ounces of gold dust were recovered, the value being \$156,936.54 for gold and \$396.69 for silver. Two thousand feet of hydraulic pipe was laid to a creek on the right limit of Sixtymile opposite creek claims No. 13 above Discovery, to convey water for cold water thawing and stripping.

At Miller creek, McDonald, McCormick and Stewart moved 1,825 cubic yards of dirt by tunnelling and sinking, 6,444 yards by drifting and 45,200 yards by hydraulic, the maximum number of men employed in these operations was 13.

On Iron Creek, a tributary of Nisutlin river the Inca Mining Corp., Ltd., constructed some 20 miles of road, 6,500 feet of flume and 2,000 feet of pipe line, this corporation employing three monitors moved 75,000 cubic yards of gravel before the freeze up in 1934.

More individuals were mining during the year on the old placer creeks in the Territory than for many years past, and all appear to have met with a certain measure of success. No new discoveries of any importance have been made, but the new high price received for gold has made it profitable to work old diggings over again, as well as the lower grade ground hitherto unworked.

Table 47.—Summary Statistics of Alluvial Gold Mining in Canada, 1933 and 1934

	1933			1934		
	British Columbia	Yukon	(a) Quebec and Alberta	British Columbia	Yukon	Quebec and Alberta
Number of firms and individual operators*..	65	3	5	85	4	4
Time in operation.....months	6-10	6-8	6-8	6-10	6-8	6-8
Capital employed.....\$	3,854,721	6,539,997	6,187	2,074,138	10,117,273	2,124,290
Number of employees.....	254	189	11	352	248	15
Salaries and wages paid.....\$	268,119	431,533	4,499	442,957	571,423	13,189
Fuel and electricity used.....	17,045	18,101	19	29,334	42,139	5,142
Electricity generated for own use.....K.W.H.	95,002	11,206,000	.....	325,000	11,926,000	100,000
Crude gold recovered.....crude ounce	23,928	48,967	504	25,181	48,379	293
Platinum recovered.....crude ounce	40	.....	.....	53	.....	.....
Value of platinum recovered.....	1,400	.....	.....	2,051	.....	.....
Quantity of material handled.....cu. yds.	1,326,721	5,605,522	(c)	2,034,522	6,315,070	155,000
Length of ditches.....miles(d)	84	125	.....	124	25	.....
Total value of alluvial products(b).....	408,176	832,439	8,568	430,128	822,443	7,912

*In addition to the number shown in the table, there were several other small operators from whom no returns were obtainable.

(a) Includes data relating to one property in Nova Scotia.

(b) Value of crude gold based on statutory price of the metal (\$20.67) and estimated at \$17 per crude ounce.

(c) Information not available.

(d) Includes flume.

THE AURIFEROUS QUARTZ MINING INDUSTRY

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of MacKenzie river. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely quartz veins, from which most of the gold up to the present time has been won, and sulphide deposits, which produce a smaller but increasing proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon territories, the gold production from this section was largely of placer origin until recent years. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada the metal occurring principally in Nova Scotia where it has been mined since 1862.

The increase of approximately 67 per cent in the price of gold since 1930 is distinctly reflected in the almost steady expansion in gold mining during recent years. The number of auriferous quartz mines in operation in 1934 totalled 416, an increase of 93 per cent over 1933; employment

in 1934 totalled 17,762 as compared with 12,823 in the preceding year and salaries and wages amounted to \$27,156,887 as against \$20,536,012 in 1933. Ore milled in 1934 totalled 7,475,278 tons and the gold content of bullion, ores, etc., shipped amounted to 2,490,513 fine ounces, a comparison of these figures with corresponding data for 1929 is especially interesting in that they show a decline in the gold content of ores milled of from .42 ounce per ton in 1929 to .33 ounces per ton in 1934. This decrease results directly from the milling of lower grade ores made economically permissible by the increase in gold prices. Dividends reported by the auriferous quartz mines as being distributed in 1934 totalled \$27,888,731 as compared with \$20,030,200 in 1933, total dividends paid by these mines to the end of 1934 totalled \$299,064,915.

The Department of Mines, Ottawa, reports that the cost of small milling plants in Canada ranges from \$800 to \$2,000 per ton of ore treated daily, depending on factors such as location, new or second-hand machinery installed, the size of the unit and the type of plant, the department also stresses the importance of having the ore investigated for treatment methods before building a milling plant. The Dominion Department of Mines maintains ore dressing and metallurgical laboratories for this purpose.

Nova Scotia.—The Department of Public Works and Mines for Nova Scotia reports that a great amount of interest was taken in the gold deposits of the province during the fiscal year ended September 30th, 1934, some notable developments were conducted and the output for the next twelve months should show a very material increase. In the province the modern powdered coal plant will no doubt supply a large percentage of the cheap power required for mining in the future. This type of power plant will be situated near the collieries and will be used to augment the power supplied by Hydro-developments. In Guysboro county development or exploration work was conducted on gold properties in the Cochran Hill, Country Harbour, Forrest Hill, Ecum Secum, Gegogan, Goldenville, Isaac's Harbour, Little Liscombe Lake, Liscombe Mills, Lower Seal Harbour, Sangster Lake, Upper Seal Harbour and Wine Harbour districts. Properties were active in Halifax county in the districts of Beaver Dam, Caribou, Killag, Lake Catcha, Lawrencetown, Montague, Mooseland, Moose River, Oldham, Salmon River and Waverly; work was especially intensive at the Montague mine where extensive underground mining was conducted, milling commenced at this property in May. In Hants county mining operations were carried on in the Central Rawdon, East Rawdon, Mount Uniacke, South Uniacke and Renfrew districts. Mining operations in Lunenburg county were conducted in the Blockhouse, Gold River and Ovens districts. More prominent among the developments in Queens county were the operations conducted by the United Gold Fields of Nova Scotia Ltd., this company completed extensive underground work and commenced milling in February of 1934, in the same county exploration work was conducted on properties in the districts of Fifteen Mile Brook, Mill Village, Molega, West Caledonia, Westfield and Whiteburn.

For more comprehensive information regarding gold mining in this province communicate with the Department of Public Works and Mines, Halifax, Nova Scotia.

New Brunswick.—The only gold mining activity reported in this province during 1934 was the examination of a prospect on Guagus stream, a branch of the North Branch Little South West Miramichi River, its commercial possibilities were not indicated.

Quebec.—Gold mining operations were particularly widespread and varied in N.W. Quebec during 1934. Particulars relating to some of the more important developments are as follows: "After ore had been found by Lamaque Gold Mines Ltd., on all levels that had been opened up to a depth of 700 feet, plans were made in August 1934, for a construction and mine development program designed for an initial treatment capacity of 225 tons of ore per day to commence June 1st, 1935. The company reports a technical estimate of "positive ore" reserves at January 1st as follows:—

	Tons per ton	Average grade Pen- nyweights	Total gold in penny- weights
Blocked ore.....	53,263	6.08	323,985
Broken ore in mine.....	669	12.88	8,604
Broken ore on surface.....	20,563	6.48	133,111
Totals and average.....	74,495	6.25	465,700

Canadian Malartic Gold Mines Ltd., reported that the first seven months of the year were devoted to exploration and development for the purpose of establishing an ore reserve position that would warrant the construction of a mill, subsequent to August 1st, underground work was confined to mine preparation. The mill under construction will be an all cyanide unit having a treatment capacity of 125 to 150 tons daily. The crushing section will have a capacity of 400 tons daily. The estimated ore reserves as of December 1st are as follows:—

		Value gold at \$34.00
Assured ore reserves.....	198,000 tons at .238 oz.	\$ 8.07
Indicated ore.....	340,000 tons at .186 oz.	6.32
Total.....	538,000 tons at .205 oz.	6.97

During 1934 active exploration work was carried on by Beattie Gold Mines Ltd., and it is reported that the property of this company is now at a stage where development work during 1935 should add materially to the already large reserves of ore. It was stated at the end of the year that the metallurgical treatment of the ore still remained the chief problem at the mine. The fineness of the mineral particles and the refractory nature of the ore presents great obstacles to a satisfactory recovery by simple flotation and cyanidation and much work was still necessary before the best method could be evolved. The fundamental question of ore reserves is reported sound, the mill treated 359,200 tons averaging 0.1812 ounces per ton for an operating profit of \$491,425.90 after very liberal expenditures of \$224,123.88 on mine development.

In June, 1934, it was reported that Siscoe Gold Mines Ltd., had completed shaft sinking to the 1,350 feet level, with three new levels established. The present program of development it was reported consists in developing, both horizontally and downward, the ore bodies already discovered and in the exploration of new territory. As a result of the development work ore reserves were increased 37 per cent to a total of 283,426 tons having an average value of \$15.56 per ton. The mine and mill were both in continuous operation throughout 1934, the company employing both amalgamation and cyanidation.

The Bussières mine in Louvicourt township was active throughout the year, 5,065 ounces of crude gold were recovered by amalgamation and 277 tons of concentrates shipped to the Noranda smelter. At the McWatters gold mine a 50 ton amalgamation mill was erected and placed in operation in September. Since the beginning of 1935 it was decided to add a cyanide unit to the present mill and on completion of this work tonnage will be stepped up to 100 tons per day. It is reported that from stope developments and mill results, there exists an unbroken reserve of 50,000 tons of \$25 (gold at \$35) ore. In addition there are 6,768 tons on the surface ore dump estimated to average \$15 (gold at \$35).

Arntfield Gold Mines Ltd., conducted extensive underground and surface operations during 1934 and it was reported that the new 125 ton mill under construction at the property would be ready to turn over in July, 1935.

The Green Stabell mine located in Dubuissou township was productive throughout the year, 4,099 ounces of crude gold were recovered by amalgamation and 2,298 crude ounces by cyanidation, concentrates were shipped to the Noranda smelter; a progress report issued in April, 1934, estimated two years' ore reserves averaging approximately 0.4888 ounces per ton.

In Cadillac township the mine and mill of the O'Brien Gold Mines Ltd., were in continuous operation throughout the year, recoveries were made by amalgamation and concentrates were shipped to the Deloro Smelting and Refining Co., for experimental purposes.

Perron Gold Mines Ltd., located in Pascalis township carried out extensive underground and surface operations and commenced milling operations in July, amalgamation is employed in this mill.

Mining and milling operations commenced in May, 1934, at the Sullivan Mine located in Dubuissou township, the company recovered 2,430.71 ounces of crude gold by amalgamation and 3,470.15 ounces by cyanidation. Milling capacity will be increased to 100 tons per day. The company estimates probable ore reserves at 46,300 tons at .467 ounces per ton; presently

possible and possible ore, 22,000 tons, expected to be of average mine grade. In the Chibougamau are extensive prospecting and exploratory operations were conducted by Consolidated Chibougamau Goldfields Ltd., and other companies.

For more detailed particulars relating to gold mining in Quebec, mining laws, etc., communicate with the Bureau of Mines, Quebec, P.Q.

Ontario.—The Department of Mines, Ontario, reports that the year 1934 showed marked improvement in gold mining and while the ounces recovered in the province declined the quantity of ore treated increased, moving up from 5,621,000 tons during 1933 to 6,505,000 tons in 1934. The performance indicates the increased milling facilities and also the ability of operators to treat much lower grade ore, thereby increasing the life of the mines and the communities now dependent on this industry. At Porcupine the average value per ton of ore treated at the Canadian price of gold was \$8.56, at Kirkland Lake, \$17.18 per ton, in Matachewan, \$6.13 and in Northwestern Ontario, \$4.82 per ton. While the output from the Northwestern portion of the province was small and mainly produced by one mine, the Howey, it is of interest to record the reopening of many old properties which were producers in the nineties. In addition important new mines, including the Little Long Lac, have recently come into production. When it is remembered that favourable gold formations are known to exist and that new finds are becoming general over a wide area, the developments in gold mining in this part of the province promise to be of considerable importance during the next few years. In the late summer new finds were reported from the Sturgeon river area, east of Lake Nipigon. A gold "rush" followed and hundreds of claims were staked and recorded. Very rich veins on the claims of the Sturgeon River Gold Mines have been found both on surface and by diamond drilling. Favourable developments at Little Long Lac mine and also at the Central Patricia and Pickle-Crow mines near the Albany river, with continued interest at Red Lake suggest a general revival of gold mining in the Northwestern part of Ontario. McKenzie Red Lake, the second producer at Red Lake, turned over its new 125 ton mill in February, 1935, and expects to be in production in March. The 100 ton cyanide mill of the Matachewan Consolidated Mines Ltd., was brought into production in 1934. As soon as the mine has been opened up sufficiently and ore conditions warrant, it is the plan of the company to increase the daily tonnage to around 300 tons per day, indicated ore reserves are estimated at 1,170 tons per foot of depth, averaging 0.199 ounces gold per ton. The following figures show mill feed and production for the months of November and December:—

	Ore delivered	Waste sorted	Ore treated	Head sample average grade
	tons	tons	tons	oz.
November.....	2,302	260	2,042	0.22
December.....	2,712	74	2,638	0.26

The mill of the Young-Davidson Mine at Matachewan went into operation on September 8, 1934, open pit operations were continued throughout the winter, but under many difficulties, and plans are under way for underground mining during this season. The gold content in the ore has been \$1.76 on the \$20.67 basis or \$2.88 on the new price. Ore treated to the end of 1934 amounted to 51,842 tons and operating profits amounted to \$53,605.

The Hollinger Consolidated Gold Mines Ltd., reported that operations at the Hollinger Mine, Timmins, were carried on at all levels from the surface to the 3,950 foot level; 35.8 per cent of the ore milled came from above the 800 foot level, during the year 877,837 tons of backfill were placed. Ore reserves on December 31, 1934, consisted of 7,061,926 tons of a total value of \$51,440,260, having an average value of \$7.28 per ton; at the end of 1933 the reserves were 6,487,559 tons of a total value of \$48,430,451, having an average value of \$7.47 per ton. Total cost per ton of ore milled in 1934 was \$3.9281. In the calculations dealing with ore reserves, the statutory price of gold, \$20.67 per ounce, was used and the same minimum ore grade as used in former years continued; the net profits of the company for 1934 from all sources was \$6,505,363.

Dome Mines Ltd., hoisted 587,200 tons of ore, of this 547,600 tons were milled and 39,600 tons waste, 16,200 tons of waste were dumped into old stopes. The 547,600 tons of ore milled yielded bullion containing 203,896.878 ounces of gold, the yield per ton being 0.3723 ounces. The ore reserves are estimated at 2,000,000 tons. Ore in the sediments is estimated at 212,000

tons and the ore in the greenstones and contact is estimated at 1,788,000 tons. Ore from stopes wholly in the sediments yielded in 1934, 95,171 tons, averaging 7.45 dwt. per ton. Ore from stopes wholly in the greenstones and partially in the greenstones yielded 402,829 tons averaging 7.88 dwt. per ton. Operating costs for the year were \$3.877 per ton milled. The net operating profit, before depreciation and income taxes, for the year was \$4,549,617.

In its report for the fiscal year ended March 31, 1935, McIntyre Porcupine Mines Ltd., states "that in accord with the policy projected previously, development work and stoping operations were further extended into what was previously considered marginal ground. While this had the effect of decreasing the grade of ore treated, we increased the mill capacity to an extent sufficient to compensate, and the gross value of our production closely approximates the total of a year ago." Data pertaining to operations of the company during the past year are as follows:—

Ore treated.....	862,100 tons
Value per ton (·294 oz. at \$34.67).....	\$ 10.23
Gold recovered, per ton.....	281 oz. 9.79
Operating costs:—	Costs per ton ore milled
Exploration.....	\$ 0.0922
Development.....	\$ 0.5122
Breaking and stoping.....	\$ 2.7461
Total mining.....	\$ 3.3505
Milling.....	\$ 0.7187
Administration and general.....	\$ 0.1193
Grand Total.....	\$ 4.1885

Ore reserves were reported as follows:—

	Tons	Fine oz. gold
Estimated.....	3,219,460	1,046,226
Broken.....	211,021	57,600
Total.....	3,430,481	1,103,826
Average per ton.....		·3217

In the Kirkland Lake camp, Lake Shore Mines Ltd., reports that for the fiscal year ending June 30, 1934, receipts from bullion amounted to \$16,382,274 from 836,991 tons of ore milled, giving a value per ton of \$19.57. The production in ounces amounted to 485,384 gold and 99,041 silver. Dividends and bonuses for the period totalled \$6,000,000. Ore hoisted from development totalled 29,571 tons and from mining, 809,878 tons. The company states that the very considerable tonnage of lower grade material made available for mining to a large extent by the increase in the world price received for gold, has removed, for the immediate future, the necessity of intensive explorations in lower horizons of the mine. All of the ore mined was extracted by cut and fill methods or over stulls in narrow sections of No. 1 vein. Back fill to the extent of 407,835 tons was placed during the period. The total cost per ton of ore mined and milled was \$7.168. Broken ores reserves stood at 230,858 tons with a value of .81 ounces per ton, reserves of ore in place, available for immediate mining were fully maintained.

During the fiscal year ending August 31, 1934, the Teck-Hughes Gold Mines, Ltd., treated 474,700 tons of ore, the recovery of bullion and precipitate was the equivalent of 181,453 Troy ounces of fine gold which realized \$5,877,974. After the addition of other income the gross revenue was \$5,983,525 or \$12.60 per ton of ore milled. After making provision of \$224,016 for taxes and adding \$19,104, a profit derived from the sale of bonds, the surplus was \$3,048,602. The estimate of gold in "positive ore" decreased from 375,495 ounces at August 31, 1933, to 323,088 ounces at August 31, 1934. Mine workings within the ore zone were deepened from

5,074 feet to 5,735 feet. The company states that while decreasing earnings from gold production may be expected, present indications are that the Teck-Hughes mine can be profitably operated for several years to come. The following is an analysis of operating costs:—

	Cost per ton of ore treated	Cost per ounce of gold produced
Development and exploration.....	\$	\$
Mining.....	0.93	2.44
Milling.....	2.79	7.29
Milling.....	0.96	2.52
General expense.....	0.49	1.27
Examination of new properties.....	0.05	0.13
Depreciation.....	0.53	1.39
Total.....	5.75	15.04

Miscellaneous operating data supplied by Howey Gold Mines, Ltd., are as follows for 1934:—

Tonnage milled and sorted.....	481.757
Tonnage discarded by sorting.....	85.648
Tonnage milled.....	396.109
(x) Value a ton hoisted.....	\$ 2.20
(x) Value a ton material discarded.....	\$ 0.21
(x) Value a ton ore milled.....	\$ 2.64
(x) Loss in tailings a ton milled.....	\$ 0.214
(x) Loss a ton of ore hoisted (in milling or sorting).....	\$ 0.213
Net recovery percentage a ton of ore hoisted.....	90.3
(x) Gold at \$20.67 per ounce.	

Analysis of costs at the Howey Mine, Red Lake, 1934, is as follows:—

	Cost per ton
	\$
Mining operation.....	1.032
Outside exploration.....	0.005
Crushing and conveying.....	0.093
Ore sorting.....	0.049
Milling.....	0.452
General expense.....	0.133
Total plant cost.....	1.764
Total costs, including depreciation, etc.....	2.396

Broken ore reserves in the Howey mine as of December 31, 1934, amounted to 301,990 tons and unbroken reserves totalled 1,853,097 tons. The value of broken and unbroken reserves is estimated to be approximately \$3.50 per ton based on the current price of gold.

The three-compartment vertical shaft at the Little Long Lac Mine reached its objective of 719 feet during August. The following is a concise summary of the results on the second, third and fourth and fifth levels as at December 30, 1934.

Level	Ore length	Average width	Average grade
Second.....	feet	feet	oz.
Third.....	364	5.85	0.688
Fourth.....	760	4.80	0.735
Fifth.....	754	5.04	0.678
	245	5.27	0.840

Milling commenced at the mine in November, 1934. The same year also witnessed the bringing into operation of new mills at the Central Patricia and St. Anthony mines.

For more complete information relating to gold mining in Ontario, Ontario mining laws, etc., communicate with the Ontario Department of Mines, Toronto, Ontario.

Manitoba.—Mining activities were almost general throughout the gold bearing areas of Manitoba in 1934. Idle properties in the older camps were investigated as to their economic possibilities under the current price for gold and development and exploration programs were intensified in the newer areas.

The mine and mill of the Central Manitoba Mines Ltd., were operated continuously in 1934, the mill recovered 10,033.66 ounces of crude gold by amalgamation and 15,050.50 crude ounces by cyanidation from 43,862 tons of ore; considerable diamond drilling was conducted on the property. Ore reserves were estimated in June, 1934, at 17,836 tons averaging .324 oz. gold to the ton.

San Antonio Gold Mines Ltd., operated throughout the year, 66,457 tons of ore were raised and 21,638 fine ounces of gold recovered by amalgamation and cyanidation from 64,294 tons of ore milled. It was announced at the close of the year that the joint operation of the company and Forty-Four mines in which a drive is being made from the company's 600 foot level into Forty-Four ground was progressing favourably, this intersected three veins which otherwise might not have been touched for years. Ore reserves were estimated at December 31, 1933, to be 154,000 tons averaging .425 oz. per ton. At the close of 1932 costs were estimated at \$7.21 a ton milled.

Mining and milling were recommenced in June by Diana Gold Mines, Ltd., 6,663 tons of ore were hoisted and 1,980 ounces of pure gold recovered by amalgamation from 5,284 tons of ore milled. Extensive surface and underground work was conducted throughout the year by God's Lake Gold Mines Ltd., and it was announced that an initial mill unit to handle 150 tons daily is being planned, the mill is expected to be in operation in the fall of 1935.

According to the second annual report of the company, indicated ore reserve as at the end of 1934 is as follows:—

	Tonnage	Ounces grade	Value at \$34 per oz.
Total.....	63,400	.52	\$ 17.68
Allowing for possible 20 per cent dilution in mining.....	76,000	.43	14.62

Salvage work on the small high-grade lenses of gold ore was carried on during the year by Island Lake Mines Ltd., together with further underground development work and diamond drilling. Mining operations were continuous and milling commenced in April; 6,984 tons of ore were milled for a recovery, by amalgamation, of 2,931 ounces of fine gold and in addition ore shipments were made to the Flin Flon smelter. It was announced in 1935 that the main vein had been intersected beyond the fault, the first hole showed three feet averaging 3.0 oz. gold and the second hole cut 5.7 feet averaging 1.05 oz. gold.

Other important gold mining developments in 1934 included those of Gunnar Gold Mines Ltd., in the Beresford Lake section; Laguna Gold Mines Ltd., at Herb Lake; Smelter Gold Mines Ltd., God's Lake; Vanson Manitoba Gold Mines Ltd., Rice Lake district; Wingold Mines Ltd., Bisset; Oro Grande Development Co. Ltd., Beresford Lake and Gabrielle Mines Ltd., at Bisset.

For further information pertaining to gold mining in Manitoba communicate with the Department of Mines and Natural Resources for Manitoba, Winnipeg, Manitoba.

Saskatchewan.—Gold mining activities in this province were reported from Amisk, Douglas and Wekash Lakes sections in the eastern part of Saskatchewan, while encouraging results were stated to have been obtained from prospecting and exploration work in the Lake Athabaska district, no production in 1934 was reported from properties in these areas.

For further information apply to the Department of Natural Resources, Regina, Saskatchewan.

British Columbia.—The British Columbia Department of Mines reports that in the northwestern mineral survey district prospecting was carried on at the La Porte group near Port Essington and the Mastodon group at Hastings Arm, in both of which values in gold are present. In the Liard area a lode discovery on Quartz Creek, tributary to McDames Creek, was reported late in the season and resulted in a small stampede. In the Alice Arm area gold showings were prospected on the Homestake and Gold Reef groups. Though this area has been comparatively

inactive the gold aspects of the west side of the Upper Kitsault valley area are attracting the attention of examining engineers. In the Skeena division construction and renovation work has been carried out at the old Surf Inlet mine and in the Portland Canal area a crew of about 60 men has been employed on the Big Missouri and work was done on the Unicorn, Troy, Salmon Gold, and Portland groups. Development of the Atlin Pacific Mining Company's property (Nor-gold) continued throughout the season and it is anticipated that the old Engineer mine will be opened up in 1935. Production from lode operations in the district came chiefly from the Premier and Dunwell mines, Stewart, Granby Consolidated and Surf Point mine. During 1934 the Premier Gold Mining Co. Ltd., mined and milled 154,693 tons with an average assay content of 0.25 ounce of gold and 4.3 ounces silver per ton. The estimated ore reserves as of December 31, 1934, were as follows:—ore broken in stopes, 50,113 tons, averaging 0.20 ounces of gold and 6.4 ounces of silver; assured and probable unbroken ore down to the 6th level of the present mine workings amounts to 130,687 tons, averaging 0.26 ounces of gold and 5.0 ounces of silver; exploration and development by the company during 1934 represented 10,203 feet of diamond drilling at a cost of \$1.39 per foot and 10,992 feet of drifting, cross-cutting and raising at a cost of \$11.43 per foot.

In the Northeastern Mineral Survey District prospecting and development of lode gold properties were carried out at Hudson Bay Mountain, near Smithers, Dome Mountain near Telkwa, near Babine lake and in the northern part of the district. Two encouraging discoveries were made during the year:—that of the Patmore group near Doreen in the Skeena section and that of the Timber line group near McKee lake, in the Horsefly section. In the Cariboo section, it may be said of lode gold operations generally that although some have been discontinued, a comparison between the present position and that of two years ago showed clearly that real progress has been made. The discovery of the markedly auriferous pyrite replacement deposit in limestone at the property of Island Mountain Mines Co. Ltd., last year and development there this year has aroused much interest at this property and at that of the Cariboo Gold Quartz Mining Co. Ltd., at which mineralization of similar type, although less extensive, has been found.

The greatest activity in numbers 3 and 4, Mineral Survey Districts took place in the Hedley, Osoyoos and Greenwood areas where known deposits of gold occur and where practically all the facilities for mining are at hand. Many old mines have been reconditioned and extended exploration has produced more ore. The Hedley mine has been rejuvenated by the Kelowna Exploration Co. and more ore discovered.

In the Kamloops mining division recent discoveries on the Sweet Home claim belonging to the Windpass mining company are most attractive and appear to suggest extensive exploration of the region near Chu-Chua. Taking the district as a whole, developments have been favourable and the British Columbia Department of Mines states that several mines should come into production in the future.

Gold mining in No. 5 or the Eastern district has contributed in an important degree to the improvement in the district employment situation. Production of gold for 1934 was better than any year since large scale production by the Consolidated Company ceased at Rossland. The gold mining industry of the district is now showing evidence of permanence with increased production when milling operations such as at the Yankee Girl (Ymir-Yankee Girl Gold Mines Ltd.), Kootenay Belle Gold Mines Ltd., and Queen (Sheep Creek Gold Mines Ltd.) get under way. Shipments were suspended from the first two mentioned properties and the Goodenough (Ymir Consolidated Gold Mines Ltd.) pending consummation of milling plans. Expansion to say 60 or 70 tons a day may occur at the Second Relief Mill (Relief-Arlington Mines Ltd.), though this is dependent upon the results of exploration under way by the Premier Gold Mining Co. Ltd.

A substantially larger annual production from the Reno Gold Mines Ltd., no longer handicapped by power shortage, is assured. Increased output can also be expected from some of the properties entering the production stage such as the Gold Belt Mining Co., and Ymir-Dundee. Lode Gold development and exploration were conducted on numerous prospects in the Nelson Mining Division and at points in the Fort Steele Division. Long dormant properties in the area south of Nelson are being investigated and exploration resumed at former producers such as the Porto Rico and Fern.

In the Lardeau division mill construction was announced by the Meridian Mining Co. A satisfactory feature in the district is the provision of adequate and dependable power in the Nelson-Ymir-Salmo-Erie area through the newly constructed transmission lines of the West Kootenay Power and Light Co.

Gold mining activities in No. 6, the western mineral survey district, were widespread; at the Vidette mine a 35 ton milling plant was operating on an ore stated to average about 0.75 ounces of gold to the ton; gold production also came from the Grange Property near Clinton where a 25 ton mill, more recently stepped up to 60 tons, was in operation from some months. A small production also came from the Taylor-Windfall mill (3 ton) in the Taseke Lake country. The Wayside property was equipped with a 35-50 ton milling plant of the amalgamation type and the Minto Gold Mines recently completed the installation of a 50 ton mill. In the Shoal Bay-Phillips Arm section the Hercules Consolidated Mining, Smelting and Power Corp., and the Shoal Bay Syndicate were active. In the main Bridge River camp the Principal Producers Pioneer and Bralorne increased their ore reserves substantially; particularly interesting have been the developments in the lowest level of the Pioneer mine and the present programme of shaft-sinking which is to go to the 3,100 foot level should result in important developments, total ore reserves were reported in 1934 at 432,000 tons averaging .95 oz. per ton. In the latter part of May the Pioneer increased its milling rate to 400 tons per day.

In the Bralorne mine interesting and very promising sections have been opened up on the 6th, 7th, 8th, 9th and 11th levels. The new milling plant at the property was placed in operation and tonnage was gradually being raised to a production rate of approximately 400 tons per day. In 1935 it was stated that the west drift on the 11th level was in an excellent grade of ore, fully as good as that opened up on the 8th and 10th levels, and it was decided to deepen the main shaft another 200 feet and open up the 12th level. Indicated ore reserves as at December 31, 1933, were reported at 230,000 tons, averaging around .60 oz. of gold per ton. The company ratified an agreement whereby 26 claims being the southerly and eastern portion of the company's properties would be acquired by a new company to be known as Bradian Mines Ltd. In December, 1934, it was announced that operations of this company were proceeding satisfactorily with both shafts completed to their objectives.

In the Bridge River camp, outside of the two producing mines and a few other properties, it may well be considered that most of the work being done is primarily of a prospecting nature. For more complete information relating to the gold mining industry in this province communicate with the British Columbia Department of Mines, Victoria, British Columbia.

Yukon and North West Territories.—The Lands, Northwest Territories and Yukon Branch of the Department of the Interior, Ottawa, reports that one hundred and ninety-one quartz grants were issued in the Dawson District during the fiscal year. Many claims were staked for which grants are pending. The staking was done principally in the Carmacks area. At the close of the fiscal year in that area there were two hundred and seventy-eight mineral claims in good standing.

The N. A. Timmins Corporation has taken options on four groups, comprising about thirty-five claims in the Carmacks area. About thirty-five miles of winter sled road was grubbed out, connecting Mt. Free gold with the overland trail, and about seventy-five tons of equipment and supplies were hauled into the new camp by tractors. A Diesel engine and compressor were installed and work was started on the "La Forma" group. To date about 800 feet of tunnel have been driven and unofficial reports indicate the results are satisfactory. Prospecting by individual claim owners and several syndicates now working should prove the value of this district in the near future. Extensive exploration and development work was also conducted in 1934 on gold bearing claims located some twenty-five miles from the mouth of the Yellowknife river at Great Slave Lake in the Northwest Territories.

For more complete information relating to mining in the Yukon Territory apply to the Lands, Northwest Territories and Yukon Branch, Department of the Interior, Ottawa.

Table 48.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1933 and 1934

(Ton=2,000 lb.)

	Nova Scotia, Saskat- chewan and Manitoba	Quebec	Ontario	British Columbia	Canada
1933					
Number of producing mines.....	12	7	28	40	87
Ore mined..... tons	117,130	360,041	5,632,869	418,814	6,528,854
Ore milled..... tons	106,719	344,747	5,612,199	383,111	6,446,776
Tailings retreated..... tons				3,658	3,658
Concentrates produced..... tons	7	11,428	1	18,812	30,248
Bullion recovered by amalgamation..... crude oz.	12,203	80,238	186,365	36,689	315,495
Bullion recovered by cyanidation..... crude oz.	37,942	5,564	2,523,309	128,124	2,694,939
Bullion shipped..... crude oz.	50,538	86,468	2,711,059	164,813	3,012,878
Content of bullion shipped—Gold..... fine oz.	37,305	76,919	2,116,142	122,293	2,352,659
Silver..... fine oz.	6,070	5,918	404,744	26,579	443,311
Value..... \$	770,215	1,591,596	43,897,662	2,544,653	48,806,211
Exchange premium..... \$	293,653	655,973	15,503,709	1,001,456	17,454,791
Net value of ores, slags and residues sold..... \$	1,075	554,480	165,088	2,169,890	2,890,533
Total value of all shipments..... \$	1,067,028	2,802,049	59,563,459	5,715,999	69,151,535
1934					
Number of producing mines.....	15	10	42	81	148
Ore mined..... tons	152,945	653,035	6,451,743	589,131	7,846,854
Ore milled..... tons	135,111	621,984	6,290,836	427,347	7,475,278
Tailings retreated..... tons			9,092	18,143	27,235
Concentrates produced..... tons	474	24,895	304	22,875	48,548
Bullion recovered by amalgamation..... crude oz.	21,519	95,778	191,317	51,171	359,785
Bullion recovered by cyanidation..... crude oz.	34,086	19,645	2,609,813	143,089	2,893,633
Bullion shipped..... crude oz.	65,815	115,423	2,784,296	211,592	3,177,126
Content of bullion shipped—Gold..... fine oz.	42,349	98,166	2,039,445	151,862	2,331,822
Silver..... fine oz.	6,489	8,061	418,115	31,081	463,746
Value..... \$	876,064	2,032,084	42,362,320	3,153,879	48,424,347
Exchange premium..... \$	580,992	1,283,535	26,497,278	2,084,059	30,445,864
Net value of ores, slags and residues sold..... \$	17,180	1,307,820	140,585	3,425,644	4,891,229
Total value of all shipments..... \$	1,474,236	4,623,439	69,000,183	8,663,582	83,761,440

Table 49.—Ores, Concentrates and Slags Shipped from the Auriferous Quartz Mines in Canada, 1933 and 1934

Item	*Ontario mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
1933					
Number of mines.....	9	4	29	9	51
Tons of ore, etc., shipped.....	352	10,483	30,289	21,954	63,078
Metal content—					
Gold.....oz.	6,353	24,241	16,157	55,955	102,706
Silver.....oz.	12,575	12,096	159,911	1,015,900	1,209,482
Copper.....lb.	1,142	551		1,471	3,164
Lead.....lb.			701,541	696,390	1,397,931
Zinc.....lb.				48,954	48,954
Net value.....\$	133,233	587,410	432,825	1,737,065	2,890,533
1934					
Number of mines.....	15	4	62	17	98
Tons of ore, etc., shipped.....	3,714	22,347	47,086	22,152	95,299
Metal content—					
Gold.....oz.	7,242	47,574	34,438	69,437	158,691
Silver.....oz.	2,818	27,812	225,119	679,787	935,536
Copper.....lb.	740,899			154,873	895,772
Lead.....lb.			269,713	2,335	272,048
Zinc.....lb.					
Arsenic.....lb.		12,000			12,000
Net value.....\$	225,969	1,239,616	984,713	2,440,931	4,891,229

*Includes two mines in Quebec and two in Manitoba in 1933 and seven mines in Quebec, two in Manitoba and two in Nova Scotia in 1934.

Table 50.—Gold Content of Bullion, Ores, Concentrates, etc., Shipped, and Ore Milled by Auriferous Quartz Mines in Canada, with Average Price of Gold in Canadian Funds, 1929-1934.

Year	Tonnage milled	Gold content of shipments fine oz.	Ounces of fine gold per ton	Average price of gold
1929.....	4,252,994	1,771,526	·42	20.67
1930.....	4,306,869	1,884,791	·44	20.67
1931.....	5,450,576	2,271,278	·42	21.55
1932.....	5,924,359	2,502,327	·42	23.48
1933.....	6,446,776	2,455,365	·38	28.60
1934.....	7,475,278	2,490,513	·33	34.50

Table 51.—Capital Employed in the Auriferous Quartz Mining Industry in Canada, 1933 and 1934

Province	Operating mines	Capital employed as represented by				
		Present value of land, buildings, fixtures, machinery, tools, equipment, etc.†	Inventory value of materials on hand, stocks in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1933	No.					
*Nova Scotia.....	12	\$ 423,727	\$ 34,809	\$ 9,000	\$ 30,476	\$ 498,012
Quebec.....	64	19,456,293	368,139	132,979	1,761,111	21,718,522
Ontario.....	54	78,480,305	2,483,512	849,286	26,934,101	108,747,204
Manitoba.....	15	6,071,066	163,755	30,901	108,068	6,373,790
British Columbia.....	71	17,029,930	349,338	297,430	3,585,705	21,262,403
Canada.....	216	121,451,321	3,399,553	1,319,595	32,419,461	158,599,931
1934						
*Nova Scotia.....	16	2,465,906	125,768	13,226	21,692	2,626,582
Quebec.....	118	30,262,502	739,518	306,646	3,043,015	34,351,681
Ontario.....	115	97,612,174	3,141,414	1,465,813	25,742,799	127,932,200
Manitoba.....	31	9,506,714	292,621	22,982	520,457	10,342,774
Saskatchewan.....	3	11,000	200		14,678	23,878
British Columbia.....	133	33,576,735	586,027	164,028	4,432,454	38,759,244
Canada.....	416	173,435,031	4,885,548	1,972,695	33,775,085	214,068,359

*In Nova Scotia there are usually a few small operations that are unreported.

†Does not include value of ore reserves.

Table 52.—Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1933 and 1934

Province	1933						1934					
	Number of employees					Salaries and wages	Number of employees				Salaries and wages	
	On salary	Wage-earners			Total employees		On salary	Wage-earners				Total employees
		Surface	Under-ground	Mill				Surface	Under-ground	Mill		
Nova Scotia.....	7	26	10	3	46	\$ 38,389	27	93	86	23	234	\$ 198,657
Quebec.....	222	665	495	61	1,443	1,936,074	376	1,031	754	110	2,271	2,957,352
Ontario.....	499	2,159	6,203	658	9,521	15,907,542	793	3,030	7,043	756	11,627	18,918,830
Manitoba.....	50	145	186	29	410	636,525	103	377	269	49	793	1,125,922
Saskatchewan.....					3	11,000	2	9			11	8,367
British Columbia.....	165	547	595	93	1,400	1,967,482	317	981	1,350	173	2,821	3,947,759
Canada.....	913	3,542	7,491	844	12,823	20,536,012	1,623	5,525	9,502	1,111	17,762	27,158,887

Table 53.—Wage Earners, by Months, in the Auriferous Quartz Mining Industry, 1932-1934

Months	1932	1933	1934
January.....	9,476	10,764	13,329
February.....	9,494	10,815	13,540
March.....	9,383	10,808	13,897
April.....	9,557	10,918	14,516
May.....	9,819	11,229	15,556
June.....	9,984	11,836	16,404
July.....	10,118	12,381	17,145
August.....	10,171	12,754	17,734
September.....	10,168	12,636	18,187
October.....	10,292	13,060	18,342
November.....	10,373	12,841	17,712
December.....	10,255	12,443	16,938

The Copper-Gold-Silver Mining Industry

The copper-gold-silver mining industry comprises a group of mines producing ores in which copper is usually the predominating metal in both value and quantity. The precious metals in these ores, especially during periods of depressed base metal prices, are often very deciding factors in the economic working of some mines of this type.

In northwestern Manitoba and in the Rouyn district of Quebec, important ore deposits of copper-gold sulphide ores, some of which contain zinc in commercial quantities, have been successfully developed and mined during recent years.

The mining of copper-gold-silver ores in 1934 was confined to the provinces of Quebec, Manitoba, Saskatchewan and British Columbia. It is to be noted, however, that a considerable quantity of gold is recovered from copper-nickel ores mined in the Sudbury area of Ontario; statistics relating to this industry are contained in the Chapter "Nickel-Copper Mining and Smelting." A summarized review of the copper-gold mining industry in Canada, by provinces, follows:—

Quebec.—At Eustis in the Eastern Townships, the Consolidated Copper and Sulphur Company operated its mine and mill throughout the entire year; 71,709 tons of ore were raised and 9,701 tons of copper concentrates and 46,626 tons of iron-pyrites concentrates produced. Concentrates of this company are exported to the United States.

In Boischatel township, Aldermac Mines Ltd., conducted mining operations at its property at Arntfield from March 1 to November 11. Considerable work was carried out underground and the mill was in operation from May 1st to November 11th; 33,604 tons of ore were raised and milled and 1,624 tons of copper concentrates and 7,312 tons of iron pyrites concentrates produced. The copper concentrates were shipped to both Canadian and United States smelters and the iron pyrites to a chemical plant.

At Rouyn, exploration at the Horne Mine by Noranda Mines, Ltd., was largely confined to the work of further outlining and developing the "lower H" ore body below the 2,475 foot level, and to the investigation on a number of levels of the area immediately west of No. 4 shaft, to determine the suitability for a location of a proposed new shaft.

The tonnages and average grade of ore shipped from the Horne mine to the smelter and concentrator in 1934 were as follows:—

	Gold	Copper	Gold per ton	Silver per ton
		%	oz.	oz.
Direct smelting sulphide ore.....	471,861	3.20	0.232	0.43
Concentrating sulphide ore.....	918,288	2.34	0.125	0.32
Silicious fluxing ore.....	386,872	0.31	0.134	0.13

The above total represents an increase of 15.2 per cent over that for the previous year.

During 1934 the smelter treated 1,050,684 tons of ore, concentrate and refinery slag (1933—1,010,629 tons) and produced 70,607,764 pounds of anodes, the average analysis of which was 99.39 per cent copper, 7.04 oz. gold per ton, and 15.66 oz. silver per ton. During 1934 the concentrator treated 920,363 tons of ore from the Horne Mine, the average assay of which was 2.34 per cent copper, 0.125 oz. gold per ton and 0.32 oz. silver per ton, from which 181,938 tons of concentrates were produced and sent to the smelter. In April, 1934, the rated daily capacity of the concentrator was increased from 2,000 to 3,000 tons and following an extensive campaign of research a hundred ton experimental cyanide unit designed to extract additional gold from the pyrite residue of the retreated mill tailing was constructed and placed in operation in June, 1934. The results obtained were so satisfactory that it was decided to construct a separate 500 ton cyanide mill to treat the entire pyrite portion of the tailing and it was expected that this would be completed and ready for operation in April, 1935. From the information obtained in drifting, diamond drilling, inclined raising and other openings in the various ore bodies, there is now indicated above the 2,725 level the following tonnage of ore:—

	Tons	Copper	Gold per ton
		%	oz.
Sulphide ore over 4% copper.....	6,826,000	7.25	0.166
Sulphide ore under 4% copper.....	20,497,000	1.04	0.191
Silicious fluxing ore.....	982,000	0.15	0.142

The above estimate means that 6,258 tons of new sulphide ore were developed or put in sight in 1934. This increase is made possible largely by the fact that the increased price of gold, together with decreased operating costs, permitted the inclusion of material that was formerly too low grade. At the present rate of mining sulphide ore, the reserve tonnage is sufficient to keep the plants operating for 18 years.

Encouraging ore discoveries were reported to have been made in 1934 by Opemiska Copper Mines Ltd. The number of high grade leases of copper-gold-silver ore was increased by four excellent new showings, one of which proved to be the best so far found. Its full limits have not yet been disclosed, but so far it is claimed to show close to 17% copper and about \$7.00 in gold and silver across seven feet for a length of 150 feet.

The property of Normetal Mining Corp. Ltd., located in Desmeloizes Tp., was under active development during the year, the shaft being completed to 950 feet and new levels opened up on the 675 and 800 foot horizons. The ore is heavy sulphide in character, the average tenor is 2% copper, 12.5% zinc, 3.9 oz. silver and .04 oz. gold. Development has proven sufficient tonnage to justify the installation of a mill of 500 tons daily capacity and consideration will be given to the installation of such a plant when metal prices justify. Other copper-gold-silver mines active during the year included those of Clericy Cons. Mines Ltd., Bagamac Rouyn Mines Ltd., Astoria Rouyn Mines Ltd., and Robb-Montbray Mines Ltd. The Waite-Amulet Mines were not reopened in 1934 as the prices of copper and zinc were considered too low to make profitable operation possible.

Manitoba and Saskatchewan.—Production of copper-gold-silver ores in the provinces of Manitoba and Saskatchewan during 1934 came entirely from the Flin Flon Mine of the Hudson Bay Mining and Smelting Co. Ltd. This property is rather unique in that the interprovincial boundary between the provinces passes through the deposit and production by the company is divided between Manitoba and Saskatchewan according to the location of ore mined. The mine and mill were in continuous operation throughout the year, 1,477,341 tons of ore were raised, 1,463,716 tons milled and 921,388 tons of tailings cyanided. Copper concentrates produced totalled 250,615 tons and zinc concentrates 76,149 tons. Metal content of ore, concentrates, etc., sent to the copper smelter and zinc plant was as follows: gold, 107,509 oz.; silver, 1,593,953 oz.; copper, 43,528,759 pounds and zinc 69,331,636 pounds. At the annual meeting in 1933, it was stated that the company had 12 to 13 years of ore ahead, without considering any new development.

The Sherritt-Gordon mine remained inactive in 1934; a report issued by the company in October stated that some sales of copper were made at prices better than those now prevailing and the shut-down expense at the property, although considerable, was being kept at the lowest possible point compatible with the proper care of such a valuable and extensive plant. The actual cost price of copper on hand is reported by the company at 6.2429 cents.

British Columbia.—The system of leasing at the Centre Star and other properties of the Consolidated Mining and Smelting Co. of Can. Ltd., was continued; some sixty leases being in operation, with the employment of 200 to 225 men; shipments to Tadanac totalled 39,397 tons. In general the lessees were able to make wages, and the operations were of considerable benefit to the community. The Coast Copper property of the Consolidated Mining and Smelting Co. of Can., was not worked in 1934, the plant and equipment were, however, kept in condition by watchmen.

At Britannia Beach in the Vancouver mining division the mine and mill of the Britannia Mining and Smelting Co. Ltd., were operated continuously throughout the entire year, 786,412 tons of ore (wet) were raised and 759,697 tons of dry ore milled. Copper concentrates produced totalled 22,536 tons, zinc concentrates, 5,662 tons, iron pyrites, 26,746 tons and copper precipitate 988 tons. The copper concentrates and the greater part of the iron pyrites production of this company went to United States metallurgical plants while the zinc concentrates were consigned to Japan.

In the Nass river mining division the Granby Consolidated Mining, Smelting and Power Co. Ltd., conducted continuous mining operations at the Bonanza and Hidden Creek mines. The mill of the company treating ores from both deposits was in operation throughout the year. Ore shipments from the Bonanza Mine totalled 133,476 tons from which were produced 8,584 tons of copper concentrates. Shipments of ore from the Hidden Creek mine amounted to 1,744,524 tons, of which 1,742,324 tons were milled for the production of 112,047 tons of copper concentrates. Concentrates produced from ores of both mines were treated in the Anyox smelter of the company. The British Columbia Department of Mines in its Report on the Mineral Industry of the Province for 1934 refers to the Anyox operations as follows: "During 1934 the continued low copper price has adversely affected the Granby operations at Anyox and the bulk of the blister output has necessarily been stored. A generally lower tenor of ore has been met by a slight increase of tonnage to the mill, which towards the end of the year was treating about 5,200 tons of ore per day. About 1,100 men are employed at Anyox with a pay-roll of \$135,000 per month. In view of the discouraging low copper price and outlook for this metal, at a shareholders' meeting held in December the directors were empowered to cease operations at any time in accordance with their discretion." The Allenby property of the company continued inactive in 1934, it has been reported that this deposit has a known life of about ten years with copper higher than 10 cents per pound.

Table 54.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1933 and 1934

Province	Number of operating mines	Capital employed as represented by				
		Present value of land, buildings, fixtures, machinery, tools, equipment, etc.	Inventory value of materials on hand, stocks in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1933	No.	\$	\$	\$	\$	\$
Ontario, Manitoba and Saskatchewan.....	4	13,928,110	1,098,754	735,638	86,106	15,848,608
Quebec.....	17	7,102,815	56,936	11,244	288,665	7,459,669
British Columbia.....	8	15,351,459	341,668	654,080	573,151	16,920,358
Canada.....	29	36,382,384	1,497,358	1,400,962	947,922	40,228,626
1934						
Quebec.....	13	5,215,696	198,001	145,578	2,145,622	7,704,897
British Columbia, Manitoba and Saskatchewan	10	25,558,173	1,325,886	2,443,229	2,860,202	32,187,490
Canada.....	23	30,773,869	1,523,887	2,588,807	5,005,824	39,892,387

Table 55.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, 1933 and 1934

	1933		1934	
	Number	Salaries and wages	Number	Salaries and wages
		\$		\$
SALARIED EMPLOYEES—				
Total.....	159	306,363	204	446,799
WAGE-EARNERS—				
Surface.....	610	3,632,415	747	4,423,002
Underground.....	1,671		1,874	
Mill.....	401		344	
Total.....	2,682	3,632,415	2,965	4,423,002
Grand total.....	2,841	3,938,778	3,169	4,869,801

Table 56.—Wage-earners by Months in the Copper-Gold-Silver Mining Industry, 1932, 1933 and 1934

Month	1932	1933	1934
January.....	3,099	2,657	2,813
February.....	3,137	2,298	2,827
March.....	3,114	2,398	2,817
April.....	3,089	2,565	2,856
May.....	3,067	2,651	2,958
June.....	3,039	2,678	2,928
July.....	2,804	2,726	2,985
August.....	2,795	2,867	3,104
September.....	2,775	2,826	3,122
October.....	2,837	2,878	3,088
November.....	2,706	2,807	3,147
December.....	2,666	2,798	2,930

Table 57.—Shipments from Copper-Gold-Silver Mines of Canada, 1933 and 1934

	Quantity	Net value (a)	Total metal content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
	Tons	\$	Fine oz.	Fine oz.	Pounds	Tons	Pounds
1933							
9 mines shipped to Canadian plants—							
Ores.....	867,789	914,642	223,494	328,918	39,561,914		
†Copper concentrates.....	495,370	4,859,812	171,954	1,619,387	107,952,457		
Zinc concentrates.....	80,780	565,460					55,938,867
Iron pyrites concentrates.....							
4 mines shipped to Foreign plants:							
Ore.....							
Copper concentrates.....	28,541	1,104,146	12,933	65,969	14,654,498		
Zinc concentrates.....	8,929	70,460					9,374,675
Iron pyrites concentrates.....	58,604	189,050				28,178	
Total.....	1,540,013	7,703,570	408,381	2,014,274	162,168,869	28,178	65,313,542
1934							
8 mines shipped to Canadian plants—							
Ores.....	868,467	829,308	162,797	282,391	33,173,070		
†Copper concentrates.....	553,515	5,769,226	194,664	1,918,638	120,185,486		
Zinc concentrates.....	76,149	451,563	5,417	144,559	1,324,297		69,331,636
Iron pyrites concentrates.....	1,199	3,769				593	
†mines shipped to Foreign plants:							
Ore.....							
Copper concentrates.....	31,866	1,039,511	11,261	79,358	15,348,073		
Zinc concentrates.....	5,889	72,493					5,374,023
Iron pyrites concentrates.....	35,957	99,201	2,889		84,697	4,908	
Total.....	1,573,042	8,265,071	377,028	2,424,946	170,115,623	5,501	74,705,659

† Includes some cyanide precipitate.

(a) See footnote under table 19, in Chapter I.

Table 58.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, 1933 and 1934

	Quebec, Manitoba, and Sask- atchewan	British Columbia	Canada
	tons	tons	tons
1933			
Ore mined.....	3,232,581	2,215,909	†5,448,690
Ore milled.....	2,363,981	2,157,320	4,521,301
Copper concentrates produced.....	397,422	123,977	521,399
Pyrite concentrates produced.....	40,070	19,284	59,354
Zinc concentrates produced.....	80,780	7,865	88,645
1934			
Ore mined.....	3,359,588	2,706,104	6,065,692
Ore milled.....	2,489,392	2,637,797	5,127,189
Tailings re-treated.....	921,388	.....	921,388
Copper concentrates produced.....	443,878	143,167	587,045
Pyrite concentrates produced.....	53,938	26,746	80,684
Zinc concentrates produced.....	76,149	5,662	81,811

† Includes 200 tons mined in Ontario.

CHAPTER III

THE SILVER MINING INDUSTRY IN CANADA

Including the Silver-Cobalt Mining Industry, the Silver-Lead-Zinc Mining Industry, and Commodity Statistics Tables on Arsenic, Cobalt, Silver, Lead and Zinc.

1. General Review.
2. The Silver-Cobalt Mining Industry.
3. The Silver-Lead-Zinc Mining Industry.
4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc.

1. General Review

(a) **Definition of the Industry.**—Silver mining is not a distinct industry in Canada, as silver is found, as an ore, usually in association with those of other commercially valuable metals; with lead and zinc, as in many of the western mines; with the cobalt and nickel arsenides of northern Ontario; with radium and uranium at Great Bear Lake, N.W.T.; and in copper and other metalliferous ore deposits. Silver is nearly always found alloyed or associated with both alluvial and lode golds from which it is recovered in the refining of the crude gold bullion. This precious metal is, therefore, a rather common constituent in many of our mineral deposits, especially in those of the non-ferrous ores, and its value as a mine product is sometimes a deciding factor in the economical working of an ore body. It is the paramount value in the rich native silver-cobalt ores of Ontario, while in the silver-lead-zinc industry it is usually recovered as an important by-product. The mining and smelting of argentiferous lead and zinc ores are very important industries, especially in British Columbia, and the silver recovered from this type of ore is a distinct contribution to the mineral production of Canada. It is therefore realized that the mining and metallurgy of silver bearing ores are closely interwoven with those of other important metals principally lead and zinc and in order to make a comprehensive survey of the Canadian silver production it is imperative to consider its various sources of origin.

(b) **Historical.**—History pertaining to early Canadian silver and lead mining is meagre. We find in Cape Breton, evidence of early colonial efforts to mine galena ores, and from the records of the French regime we find mention by Champlain of argentiferous galena on the east shore of Lake Temiskaming, this deposit was later worked under the name of the Wright mine. It is stated that early last century small shipments of galena ore were made to Europe from deposits on the east shore of Hudson's Bay. In Ontario, silver-bearing veins were found as early as 1846 in the vicinity of Thunder Bay on Lake Superior. It was not until 1866 that Thomas McFarlane discovered in this district high grade silver ore in important commercial quantities. This, a sensational "find", was made on a small rocky island not more than 90 feet in diameter and located but a short distance off Thunder Cape. The property, later known as the Silver Islet mine, produced until 1884, the year of its abandonment, approximately \$3,250,000 in silver. Some of the other producing mines of this period in the Port Arthur district were the Silver Mountain, Beaver, Rabbit Mountain and Porcupine.

Construction of the Temiskaming and Northern Ontario railroad during 1903 was highly instrumental in the finding of one of the world's richest silver areas. Grading operations along what was then known as Long Lake in northern Ontario revealed veins possessing a mixture of unfamiliar minerals, leaves and wires of a white sectile metal were found on the surfaces of pinkish coated (erythrite) vein fillings. It was only after specimens of these "queer rocks" were sent south for identification and the announcement officially made of the discovery of important native silver and cobalt ores that the country became keenly interested. Silver discoveries and mine development in the South Lorrain and Gowganda areas followed shortly after the original finds at Cobalt and represent the results attained in the widened sphere of the prospecting activity subsequent to the first "boom" in Coleman township.

History is silent as to any important silver production or discoveries in the Prairie Provinces. Small amounts have been recorded as coming from either Manitoba or Alberta and chiefly represent the metal recovered in the refining of crude gold bullion, however, during the past few years increasingly important quantities of silver have been recorded from the Copper-Gold ores of the Flin Flon mine situated on the Saskatchewan-Manitoba boundary. The dawn, or perhaps more aptly put, the false dawn of the silver-lead mining industry in British Columbia reaches back into the early decades of placer prospecting. The gravel miners penetrating the unexplored upper waters of the auriferous streams eventually encountered widespread evidence of metalliferous deposits. Rich float found in the valley bottoms was sometimes traced up the mountain sides to its source of origin, resulting in the discovery of potential mines. Early development and exploration were greatly delayed by lack of railroad facilities and it was not until late in the eighties that any appreciable production was registered. Small shipments aggregating \$37,925 were made in 1887 from various camps in the Kootenay district. It may be of interest, to note here, that the Monarch mine at Field, discovered in 1884, was a small shipper during 1887 and after 45 years of intermittent operation was reopened under sound financing in 1930 and again commenced shipping silver-lead-zinc ores under modern and more efficient mining methods. Active operations in the Ainsworth camp date from about 1888 and those in the Sardon-Silverton areas from about 1892. The discoveries of the North Star, Saint-Eugène and famous Sullivan deposits were made in East Kootenay during 1892 and 1893.

In 1930 high grade silver-radium ores were discovered at Great Bear Lake, Northwest Territories, these have been actively developed and small annual shipments of ore have since been made to metallurgical plants.

Gold was discovered in the Yukon river as early as 1869 and we find, in succeeding years, a synchronous silver production which originated in the alluvial recoveries of the former crude metal. These silver values mounted to impressive figures during the height of the Klondike placer operations. Some argentiferous lode discoveries were made in the Yukon during 1899, but there appears to have been little, if any, production therefrom until 1910, in which year an output of 37,418 ounces of vein silver was recorded. In July, 1919, L. Beauvet made the first outstanding discovery of valuable silver-lead ores in commercial quantities. This find occurred at Keno Hill, 40 miles northwest of the town of Mayo. Ore shipments from these deposits commenced during the winter of 1920-1921. It was during the latter year that the rich Sadie-Friendship vein was found. All ores and concentrates from this area are shipped to outside plants for smelting.

(c) **Sources and Status of Silver, Lead, Zinc, Cobalt and Arsenic.**—Statistics on the production of silver from Canadian ores include (a) silver contained in silver and gold bullion produced, (b) silver contained in blister copper or lead bullion made, and (c) silver estimated as recoverable from ores of all kinds exported for treatment in foreign smelters.

Figures on lead for 1934 include lead contained in base bullion made at the Trail smelter and lead estimated as recoverable from ores exported from mines in the Yukon and British Columbia. Small quantities of lead, recovered by the smelters treating cobalt or pitchblende-silver ores are also included.

Canada's 1934 zinc output comprised refined metal produced by the Consolidated Mining and Smelting Company at Trail, B.C., and the Hudson Bay Mining and Smelting Company at Flin Flon, Manitoba, together with the zinc contained in ores exported.

For two decades the ores of the Cobalt district of Ontario had been the main source of the world's supply of cobalt, but since 1926, owing to the production of cobalt by the Union Minière du Haut Katanga, from Central African copper-bearing ores, Canada's production was reduced to less than half of the world's output.

From 1904 to 1910 the Canadian cobalt production figures represent an estimate of the cobalt content of the ores shipped from the mines. From 1911 until the present time cobalt production is computed by adding the cobalt metal and the cobalt content of all cobalt oxides and salts manufactured and sold by the Ontario smelters to the cobalt paid for in ores and residues exported for treatment in foreign smelters.

Arsenic is produced in Canada from the cobalt-silver-nickel-arsenic ores of the Cobalt district by the smelter of the Deloro Smelting and Refining Company Limited, at Deloro, Ontario. Prevailing low prices and an instability of demand have prevented any expansion in the production of arsenic in Canada during recent years.

Among the metals produced in Canada during both 1933 and 1934, zinc held fourth position, lead fifth and silver sixth in point of value and among the metal producing countries of the world Canada ranked second in the output of zinc, third in silver and cobalt and fourth in lead.

The average monthly price for lead on the London market in 1934 was £10·935 per long ton as compared with £11·670 in 1933. London lead prices have shown almost continuous declines since 1930 in which year the average price of the metal was recorded at £18·077. The average London January price for lead in 1934 was £11·304; the price remained fairly steady until mid-year from which period it declined gradually to an average of £10·316 for December.

Zinc in London averaged £13·657 per long ton in 1934, representing a considerable decrease from the average of £15·666 for the preceding year. In 1930, on the same market, the price was £16·570 which, when compared with 1934, constitutes a 21·3 per cent decrease during the period specified. The average price for the metal in London for January, 1934, was £14·688; the monthly quotations remained fairly constant until June following which an almost continuous decline was recorded to December in which month the average price was £11·730 per long ton.

Silver prices showed a decided improvement in 1934. The average price for the year based on the New York market was 47·973 cents per fine ounce as compared with 34·727 cents in 1933. The metal averaging 44·188 cents in January showed little monthly fluctuations until July when, following the signing, on June 19th, by President Roosevelt, of the Silver Purchase Act, the price rose steadily to 54·390 cents as the average for December. The average price for 1934 was the highest recorded since 1929.

Quotations for white arsenic on the New York market remained, as during recent years, at a nominal price of 4 cents per pound. Cobalt metal and cobalt oxide prices remained unchanged as compared with the previous year.

2. The Silver-Cobalt Mining Industry.

Only mining and milling are considered in this chapter. Smelting of the cobalt ores, in so far as the Canadian operations are concerned, is treated in the chapter on "The Non-Ferrous Smelting and Refining Industry."

Following the production derived from Silver Islet and other properties of the Port Arthur district, comparatively little silver was produced in Ontario until the discovery in 1903 of the sensationally rich ores of the Cobalt area. From 1904, when the output of silver was over 3,000,000 ounces, the production increased rapidly until the peak was reached in 1910. In that year Ontario produced 30,366,366 ounces of silver, two years later production declined to 29,000,000 ounces and thereafter followed a generally downward trend until 1921 when less than 10,000,000 ounces were reported.

Silver recovered as a by-product in the treatment of gold, copper-gold and copper-nickel ores is of increasing importance in offsetting the decline in the recovery of this metal from arsenical-cobalt ores. Ontario is the only province producing cobalt and refined arsenic.

The mining of silver-cobalt-arsenic ores in Canada is confined to Northern Ontario. Since 1921 the annual volume of production has fluctuated to a considerable extent and in 1934 the total silver production of Ontario amounted to 5,321,160 fine ounces of which the cobalt-silver ores contributed 3,067,216 fine ounces. The Ontario Department of Mines reports that a revival of activity has recently been observed in the old Cobalt camp which was so famous for many years as a silver producer. Advancing prices for silver and a keener demand for cobalt ores indicate some measure of prosperity for this old district. During 1934 twelve properties at Cobalt and one at Gowganda made shipments totalling 2,899 tons. The properties, some of which were operated under lease, were as follows: Beaver, Cobalt Properties, Crown Reserve, Drummond lease, Dominion Reduction Co. lease, Foster lease, Hudson Bay lease, Mining Corporation lease, McKinley-Darragh lease, Nipissing, O'Brien and Temiskaming; the Miller Lake O'Brien shipped from Gowganda and in addition to these shippers development work was conducted by the Smith Cobalt Mines Ltd. and Windsor Cobalt Silvers Ltd., both located at Cobalt.

The shipments of ores and concentrate from the Cobalt area in 1934 as reported by the Temiskaming and Northern Ontario Railway were 940·27 tons to Deloro; 210·5 tons to Trail, B.C.; 821·63 tons to the Noranda smelter; and 926·11 tons for export; a total of 2,898·51 tons. In 1933 ore shipments as reported by the railway were only 1,445·09 tons and the increase is proportional to the revival in silver-cobalt mining operations.

Table 59.—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1924, 1933 and 1934

	1924	1933	1934
Number of mines in operation (x).....	34	14	16
Ore mined..... tons	433,176	60,326	54,498
Ore treated..... tons	428,509	59,304	52,337
Concentrates produced..... tons	7,360	1,063	795
Quantity of material cyanided..... tons	168,193		
Bullion recovered..... fine oz.	5,577,875	(b) 11,616	(b) 8,525
Bullion sold or shipped..... fine oz.	5,004,992	(a) 39,781	202,535
Value of bullion, ore, concentrates and residues sold..... \$	3,369,664	1,071,602	1,380,318

(x) All mines located in Northern Ontario.

(a) Base bullion from clean-up.

(b) From direct smelting of nuggets, etc.

Table 60.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1933 and 1934

	1933	1934
Capital employed as represented by:—	\$	\$
†(a) Cost of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	439,436	275,502
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	70,514	261,298
(c) Inventory value of finished products on hand.....	1,112,533	485,462
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	1,743,272	4,080,229
Total.....	3,365,755	5,102,491

†Does not include value of ore reserves.

Table 61.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1933 and 1934

	1933		1934	
	Number	Salaries and wages	Number	Salaries and wages
SALARIED EMPLOYEES—		\$		\$
Total.....	25	59,929	30	78,013
WAGE-EARNERS—				
Surface.....	66	262,352	92	283,713
Underground.....	117		132	
Mill.....	34		32	
Total.....	217	262,352	256	283,713
Grand Total.....	242	322,281	286	361,726

Table 62.—Number of Wage-Earners on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date in the Silver-Cobalt Mining Industry in Canada, 1932-1934

Month	1932	1933	1934
January.....	489	208	234
February.....	435	203	233
March.....	370	201	230
April.....	344	204	219
May.....	333	204	235
June.....	343	206	257
July.....	339	205	262
August.....	312	228	269
September.....	281	236	270
October.....	266	236	308
November.....	257	233	281
December.....	237	225	277

3. The Silver-Lead-Zinc Mining Industry

CANADA

Silver-lead-zinc ores are widely distributed in Canada. Deposits containing these metals have been either investigated or developed in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, British Columbia, the Yukon, and the Northwest Territories. The mining and metallurgical treatment of this type of ore is largely confined to British Columbia where the growth of this particular branch of the mining industry is closely associated with the successful development and treatment of the Sullivan mine ores by the Consolidated Mining and Smelting Company of Canada.

QUEBEC

No shipments of lead-zinc ores or concentrates were made from Quebec mines in 1934. However, considerable development and exploratory work was conducted on deposits located in Lemieux township, Gaspé County, and at Montauban les Mines, where silver-lead-zinc ores were mined from 1910 to 1929 at the Tetreault Mine; during the latter year 29,798 tons of flotation concentrates were shipped from this property to foreign smelters.

ONTARIO

Lead and zinc mineralization is fairly common in certain sections of Ontario. Several years ago lead ores were mined and smelted in Frontenac and Hastings counties. During the years immediately preceding 1931 the greater part of the Ontario lead production came from the now abandoned Kingdon mine at Galetta. All of these deposits in eastern Ontario possess more or less common characteristics; veins are usually in or associated with crystalline limestones of the Grenville series and the vein matter generally consists of calcite, galena, and zinc blende. A distinctly different type of lead deposit was developed at the Errington mine in the Sudbury field, where ore deposition occurs in a major fault zone passing through slates and tuffs of pre-Cambrian age. The crushed zone is, in sections, several hundred feet wide; development indicates that the ore occurs in a number of separate and often parallel shoots. Ore consists of quartz, lead, zinc and copper sulphides, carbonate, rock inclusions and massive iron pyrites; the last mineral has been replaced, in part, by zinc blende, galena and copper pyrites. No lead mines have been operated in Ontario since 1931.

MANITOBA

Silver production in Manitoba during 1934 amounted to 1,252,920 fine ounces valued at \$594,647. This was contained in blister copper made at the Flin Flon smelter and in crude gold bullion produced from auriferous quartz ores. No lead ores are mined in Manitoba; important quantities of zinc are removed from the Flin Flon deposit.

SASKATCHEWAN

The production of silver recorded for Saskatchewan in 1934 totalled 87,551 ounces valued at \$41,552 and represents the estimated quantities of the metal recovered from Flin Flon ores mined on the Saskatchewan side of the Manitoba boundary by the Hudson Bay Mining and Smelting Co. Ltd.

BRITISH COLUMBIA.

The British Columbia Department of Mines' annual report for 1934 contains the following information relating to silver-lead-zinc mining operations: "During the period under review the Trail plants of the Consolidated Mining and Smelting Company were operated on the largest scale in their history. Lead and zinc production established an all-time high volume record, with an accompanying large increase in silver. This is due primarily to the greater output of the Sullivan mine at Kimberley to meet the requirements of the smelter. The Monarch mine of the Base Metals Mining Corporation at Field contributed substantially to the production of these metals, lead and zinc concentrates having gone forward regularly to European smelters. Customs shipments to the Trail smelter, chiefly gold ores and concentrates, show a substantial increase, with contributions from thirty-four properties in the Nelson division, twenty-eight in the Slocan camp (including portions of the Ainsworth and Slocan City divisions), eleven in the Trail Creek division (exclusive of the large output made by lessees at the Rossland mines of the Consolidated

Mining and Smelting Company), and three in the Lardeau, Arrow Lake and Fort Steele divisions. The Slocan camp shipments, with few exceptions where the ores contained gold, consisted of silver-lead-zinc ore and concentrates chiefly derived from leasing operations. . . . It is worthy of note that in the peak years of silver production in the Slocan the value of lead produced was not far below that of silver. Under existing conditions, little or nothing can be obtained for the lead content of these ores, so that for the immediate future production will have to be estimated on the silver content only. Even under such conditions an appreciable increase in silver production may be anticipated. . . . the volume of lead production is likely to remain about the same. The present price of the metal is low beyond reason, and while the price of 1925 may never again be reached, a reasonable appreciation in value should be attained within the next few years. . . . while it is anticipated that the volume of zinc will be maintained, due to a demand for electrolytic zinc, and the position which the British Columbia metal has won in world markets in spite of keen competition, it is not anticipated that any appreciable increase in the price of the metal will be realized."

The total production of the Sullivan mine in 1934 amounted to 1,748,401 tons, comprising 1,745,992 tons of lead-zinc ore, shipped to the concentrator at Kimberley and 2,409 tons of crude lead ore to the smelter at Tadanaac, an increase of 335,023 tons over the shipments of the previous year. The concentrator treated 1,745,992 tons and produced 221,680 tons of lead concentrates and 192,552 tons of zinc concentrates. The average feed to the ball mills contained .5 ozs. per ton more silver, 9 lb. more lead and 5.2 lb. less zinc than in the previous year. The Consolidated Mining and Smelting Company reports that consumption in Canada was higher than for several years past and sales in the United Kingdom—our largest market—reached record volume in both lead and zinc. However, foreign production, being in excess of foreign demand, has precipitated distress selling by foreigners in the British market and an effort is now being made to have "world prices" interpreted in the spirit of the Ottawa agreements.

Following is the metal production and tonnage treated at Kimberley and Trail plants together, from 1894 to date, and for 1934:—

	1894 to 1934 (inclusive)	1934
Tons ore treated.....	24,463,646	1,792,298
Gold produced.....	2,381,581	85,328
Silver produced.....	113,951,029	7,316,231
Lead produced.....	3,797,121,176	315,346,312
Copper produced.....	184,673,769	1,567,078
Zinc produced.....	2,020,375,232	221,955,701
Cadmium produced.....	2,650,668	283,611
Bismuth produced.....	576,871	246,092

The company announced that the further downward extension of the Sullivan mine orebody was confirmed by diamond drilling from the 3,350 and 3,200 stations and indicated as maintaining average width and satisfactory grade.

The Monarch mine of Base Metals Mining Corporation, Ltd., was operated at full capacity during 1934, except for a short delay in February to push forward the production drift. Another temporary closedown for the same reason was made in February, 1935. Advantage is being taken of this temporary closedown to get well under way with an extensive development programme which has been in contemplation for some time past. This company milled in 1934 94,880.4 dry tons of ore assaying 2.08 ounces of silver, 10.9 per cent lead and 14.7 per cent zinc. The costs of milling, including all overhead, office, insurance and contingencies were equivalent to \$1.16 per ton milled.

NORTHWEST TERRITORIES

In April, 1934, it was officially announced that the concentrator of Eldorado Gold Mines located at Great Bear Lake would be increased to 75 tons per day. It was stated that on the 125 foot level of the company's mine, 393 feet of drifting, up to the end of May, 1935, had exposed two important orebodies. West of the shaft 210 feet of ore was exposed and east of the shaft 145 feet of ore. Both exposures compare in width and grade with that on the adit level. On the 250 foot level, up to May 31, 1935, 175 feet of drifting had been completed, the last 50 feet of which, it is reported, disclosed an important silver and pitchblende deposit. In 1934 the Port Hope Radium Refining plant of the company received from the Great Bear Lake mine 77 tons of

pitchblende and silver ore and 7 tons of silver concentrates. It was announced in the press that twenty-six tons of ore were treated during the year with a recovery of radium, uranium, silver and lead amounting to \$210,000.

Consolidated Mining and Smelting Company of Canada, Ltd., reported that underground development was continued on its Echo Bay group, with somewhat favourable results. The main crosscut intersected a vein, not previously located on the surface, but parallel in strike to number two vein, which carried fair values in silver for 85 feet, with some sections of high grade composed of leaves, wires and plates of silver. No pitchblende ore was encountered and no shipments of silver ore made. Other important mining operations in this territory included those of Bear Exploration and Radium Ltd., Great Bear Lake Mines, Ltd., and White Eagle Silver Mines, Ltd.

YUKON

The Comptroller of the Yukon Territory reports that during the fiscal year ending March 31, 1935, the Treadwell Yukon Company, Ltd., carried on mining operations during the early part of the year on the "Silver King" claim. There were 2,985 tons of ore produced from which 1,610 tons of shipping ore was sorted. The number of tons of ore shipped during the year was 2,242 of which 632 tons were produced during 1933. The metal content of ore shipped was 506,058 ounces of silver, 1,832,117 pounds of lead, and the market value was \$326,621. In addition, 177 tons of ore were shipped by this company for individual operators, the metal content of which was 72,967 ounces silver, 208,660 pounds of lead, and the market value, \$46,367. This company plans to dismantle its mill at Wernecke and move it to one of their properties on Galena Hill during the summer of 1935. Considerable development work was also carried out on the "Bunny" and "Highlander" claims on Keno Hill; this was conducted by the York Investment Company of Vancouver.

Table 63.—Shipments of Lead Ores and Concentrates from Canadian Mines, 1925-1934

(For years 1913 to 1924 see 1928 report of the Mineral Production of Canada)

Year	Shipments		Lead content in pounds	Silver content in ounces
	Tons	Value		
		\$		
1925.....	208,588	15,420,756	237,675,311	6,024,213
1926.....	255,048	17,546,728	273,963,827	8,616,164
1927.....	275,328	13,044,514	308,903,620	8,831,840
1928.....	255,944	12,178,879	322,239,859	10,287,591
1929.....	258,203	15,990,117	328,877,236	10,177,926
1930.....	259,630	11,024,912	336,976,074	10,172,485
1931.....	193,370	5,678,421	253,963,266	8,502,392
1932.....	190,700	4,241,652	246,051,119	8,031,587
1933.....	200,686	5,756,420	266,522,718	7,405,322
1934.....	247,014	6,954,706	339,932,667	7,735,304

Since 1932 figures include silver in silver-radium ore shipped from Northwest Territories.

NOTE.—For complete metal contents of silver-lead-zinc ore shipments for 1933 and 1934 see Table 65.

Table 64.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry in Canada, 1933 and 1934

		Yukon, Northwest Territories and Quebec	British Columbia	Canada
1933				
(x) Ore mined.....	tons	4,909	1,451,078	1,455,987
Ore milled.....	tons		1,435,357	1,435,357
Concentrates produced—Lead.....	tons		178,379	178,379
Zinc.....	tons		182,142	182,142
Others (data not available for publication).....	tons			
1934				
(x) Ore mined.....	tons	5,776	1,850,480	1,856,256
Ore milled.....	tons	2,742	1,836,622	1,839,364
Concentrates produced—Lead.....	tons	154	234,404	234,558
Zinc.....	tons	350	229,062	229,412
Others (data not available for publication).....	tons			

(x) Includes silver-pitchblende ores mined in Northwest Territories.

NOTE.—Concentrates produced in Quebec were not shipped in 1934.

Table 65.—Destination of Shipments from Silver-Lead-Zinc Mines of Canada,† 1933 and 1934

Products shipped	Tons shipped	Net value at shipping point	Total metal content as determined by settlement assay:			
			Gold	Silver	Lead	Zinc
			fine oz.	fine oz.	lb.	lb.
1933		\$				
To Canadian smelters—						
Lead ore.....	17,315	351,754	2,563	747,107	8,960,712	1,561,005
Lead concentrates.....	172,882	4,598,533	4,749	4,312,318	245,193,821	14,803,258
Zinc ore.....		1,767,130	2	344,193	11,969,713	179,473,005
Zinc concentrates (x).....	175,240	23,207	183	54,457	23,787	
Dry ore (a).....	596					
Total.....	366,033	6,740,624	7,497	5,458,075	266,148,033	195,837,268
To foreign smelters—						
Lead ore.....	2,619	371,363	253	1,273,199	1,764,243	
Lead concentrates.....	7,274	411,563	67	1,018,241	10,580,155	
Zinc ore.....						8,408,405
Zinc concentrates (x).....	6,966	46,317				
Dry ore.....						
Total.....	16,859	829,243	320	2,291,440	12,344,398	8,408,405
1934						
To Canadian smelters—						
Lead ore.....	9,479	435,969	529	982,292	3,746,086	1,173,828
Lead concentrates.....	222,921	6,029,344	158	6,015,793	315,207,427	16,316,514
Zinc ore.....						
Zinc concentrates (x).....	192,821	1,764,463		427,558	14,341,082	196,681,577
Dry ore (a).....	471	75,437	215	109,964	17,839	
Total.....	425,692	8,305,213	902	7,535,607	333,312,434	214,171,919
To foreign smelters—						
Lead ore.....	2,225	175,348	111	494,284	1,818,569	6,348
Lead concentrates.....	11,918	238,608		132,971	19,142,746	
Zinc ore.....						26,901,816
Zinc concentrates (x).....	22,223	165,912		2,715	71,293	
Total.....	36,366	579,868	111	629,970	21,032,608	26,908,164

(x) Does not include zinc concentrates produced from copper-gold-zinc ores in Manitoba or British Columbia.

(a) Includes shipments of silver ores and pitchblende from Northwest Territories. Information relating to radium content of pitchblende is not available for publication.

†Shipments of silver-lead ores were made entirely from mines in British Columbia and the Yukon in 1933 and 1934; shipments from whom returns were received numbered 27 in 1933 and 35 in 1934.

NOTE.—In addition to the metal contained in shipments listed above, there are important quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia.

Table 66.—Capital Employed in the Silver-Lead-Zinc Mining Industry in Canada, 1933 and 1934

Province	Capital employed as represented by				
	Present value of land, buildings, fixtures, machinery, tools, equipment, etc.†	Inventory value of materials on hand, stocks in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	\$	\$	\$	\$	\$
1933					
Quebec, Yukon and N.W.T.*.....	4,535,108	224,375	34,741	719,486	5,513,710
British Columbia.....	10,845,796	894,739	79,639	371,142	12,191,316
Canada.....	15,380,904	1,119,114	114,380	1,090,628	17,705,026
1934					
Quebec, Yukon and N.W.T.*.....	3,116,211	182,582		385,629	3,684,422
British Columbia.....	8,137,237	845,032	4,976	252,160	9,239,405
Canada.....	11,253,448	1,027,614	4,976	637,789	12,923,827

* Includes data relating to silver and silver-pitchblende ores mined in the Northwest Territories.

† Does not include value of ore reserves.

Table 67.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1933 and 1934

Province	1933						1934					
	On salary	Mine		Mill	Total	Salaries and wages	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground					Surface	Under-ground			
British Columbia...	110	223	407	235	975	\$ 1,252,016	107	246	504	298	1,155	\$ 1,685,395
†Yukon and Quebec.	28	50	47	.....	125	248,996	29	71	32	5	137	249,889
Canada.....	138	273	454	235	1,100	1,501,012	136	317	536	303	1,292	1,935,284

† Includes data on silver-radium mining operations in Northwest Territories.

Table 68.—Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1932, 1933 and 1934

Month	1932	1933	1934
January.....	1,012	832	1,021
February.....	1,016	820	1,012
March.....	1,031	830	1,069
April.....	1,019	787	1,091
May.....	1,003	795	1,119
June.....	980	839	1,128
July.....	973	853	1,147
August.....	973	942	1,186
September.....	966	976	1,237
October.....	919	1,007	1,270
November.....	905	1,017	1,266
December.....	886	944	1,322

4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc

ARSENIC

Arsenic in the native state is a metallic mineral but is produced at the present time in Canada only in the oxide form. The entire production is recovered at Deloro, Ontario, in the smelting of the silver-cobalt arsenides of Northern Ontario by the Deloro Smelting and Refining Company.

Occurrences of arsenical minerals are fairly numerous in Canada and arsenical gold-bearing ores have been worked in Nova Scotia, Quebec, Ontario, Manitoba and British Columbia.

Arsenic is utilized for various purposes; as an insecticide it is one of the principal constituents of Paris green and of lead and calcium arsenates; it is also employed as sodium arsenite for weed killing. Other uses include its adoption in the manufacture of certain glasses, cattle and sheep dips, paints, tanning supplies, wood preservatives and pharmaceutical preparations.

In 1934, for the first time in some years, arsenical gold concentrates were exported from Nova Scotia; these went to European plants for metallurgical treatment. The treatment of arsenical gold ores in the province of Quebec has been investigated but no commercial recovery of arsenic has been thus far reported. Arsenic bearing gold ores were exported for some years from British Columbia by the Healey Gold Mining Company.

The Chemical Trade Journal, London, comments as follows on the outlet for arsenic: "With world supplies of, and production capacity for arsenic considerably exceeding consumption, research directed specifically to finding new uses for the material is doubtlessly being carried out in various parts of the world. New bulk tonnage possibilities are, however, at the moment not unduly numerous. Fortunately, from the viewpoint of arsenic producers, the arsenates of lime and lead do not look like being displaced as yet from their position as the leading insecticides of the stomach-poison group, whilst the value which powdered sodium arsenite has been shown to possess, should mean a useful regular outlet for arsenic. In Sweden where the arsenic disposal problem is most acute, research is being directed towards arsenical wood preservatives and to the employment of white arsenic in cements and concretes. The latter-mentioned new use, about which very little of a detailed nature has been published, has the advantage of being one of the few cases in which arsenic may be safely employed for purposes depending upon factors other than its toxicity."

Table 69.—Production of Arsenic in Canada, 1925-1934

(For production from 1885-1924, see Annual Report Mineral Production, 1928)

Year	Arsenic in ore		White arsenic		Year	Arsenic in ore		White arsenic	
	tons	\$	tons	\$		tons	\$	tons	\$
1925.....	714	21,513	1,003	103,789	1930.....	1,011	34,523	1,250	95,004
1926.....	545	12,637	1,992	134,124	1931.....			1,787	135,170
1927.....	667	15,644	2,447	196,335	1932.....			1,212	98,714
1928.....	708	16,539	2,008	176,513	1933.....			734	56,534
1929.....	766	17,314	1,849	154,006	1934.....	*		824	56,412

* A relatively small quantity of auriferous arsenical pyrites was exported from Nova Scotia in 1934; no payment was made for arsenic content.

Table 70.—Production (As₂O₃), Exports and Imports of Arsenic, for Canada, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
PRODUCTION—						
From arsenical concentrates exported.. lb.					*	
White arsenic and arsenic in other forms lb.	2,424,342	98,714	1,468,022	56,534	1,647,513	56,412
Total..... lb.	2,424,342	98,714	1,468,022	56,534	1,647,513	56,412
EXPORTS—						
Arsenic, As ₂ O ₃ lb.	1,788,600	65,287	934,400	33,778	1,291,900	45,012
IMPORTS—						
White arsenic..... lb.	425,995	16,694	164,642	5,674	1,637,382	41,688
Sulphide of arsenic..... lb.	111,106	4,277	27,694	3,117	33,986	4,264
Arseniate of soda and stannate of..... lb.	5,603	1,159	390	101	638	211
Arsenate of lead..... lb.	830,120	80,488	498,673	44,256	450,748	37,788
Calcium arsenate..... lb.	521,546	27,852	287,420	17,426	165,077	9,123

* A small tonnage of auriferous arsenopyrite was exported from Nova Scotia in 1934; no settlement was made for the arsenic content.

Table 71.—World Production of Arsenic, 1932-1934

(Long tons)

(Supplied by *Imperial Institute*)

Country and product	1932	1933	1934	Country and product	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
<i>United Kingdom—</i>				<i>Greece—</i>			
White arsenic and arsenic				White arsenic.....	278	331	(a)
soot.....	247	121	185	Pyrites (As. content)....	227	443	(a)
<i>Union of South Africa—</i>				<i>Portugal—</i>			
White arsenic.....	4			White arsenic.....	10	2	40
<i>Canada—(Sales)</i>				<i>Sweden—</i>			
White arsenic.....	1,082	655	736	Ore (arsenic content).....	19,719	37,839	28,166
<i>Australia—</i>				White arsenic.....		847	7,288
White arsenic.....	1,964	1,776	2,230	<i>Roumania—</i>			
				Pyrites (As. content)....	27	61	(a)
FOREIGN COUNTRIES				<i>Mexico—</i>			
<i>Belgium (exports)—</i>				White arsenic.....	3,707	4,623	7,736
White arsenic.....	2,013	2,538	3,498	<i>United States—</i>			
<i>Czechoslovakia—</i>				White arsenic.....	11,343	9,509	11,693
Ore (As. content).....	1	55	44	<i>China—(Estimated)</i>			
<i>France—</i>				Ore (As. content).....	470	400	(a)
Ore (arsenic content)....	4,390	5,787	6,899	<i>Japan—</i>			
White arsenic.....	8,482	11,350	8,463	White arsenic.....	2,596	2,338	2,691
<i>Germany—</i>				<i>Korea—</i>			
Ore (arsenic content)....	193	(a)	1,930	White arsenic.....	(a)	150	327
				<i>Turkey—</i>			
				Arsenic ore (As. content)	3	20	13
				<i>Brazil—</i>			
				White arsenic.....	372	317	(a)

White arsenic is produced in Germany and U.S.S.R. (Russia).

(a) Information not available.

COBALT

Since the discovery of the Cobalt camp in 1903, and until recent years, the greater part of the world's supply of cobalt was derived from the treatment of cobalt-silver-arsenic ores mined in Northern Ontario. During the past few years Canada's production of cobalt decreased sharply in contrast to the totals for earlier years. This was due largely to depleted ore reserves and to new competition in the world's markets arising from the development of cobaltiferous deposits in Central Africa. There is at present only one metallurgical works in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Ltd., situated at Deloro, Ontario. This company conducted continuous operations throughout 1934 producing cobalt metal, cobalt salts and cobalt oxide.

"Cobalt has shown very substantial progress in the last two or three years, and the production is in excess of 1929, which is still the high-level year for most mine products. The chief use of cobalt was formerly in the ceramic business, and there is now a possibility of an important development as a drier in paint. In metallurgy there has been a large advance in the use of stellite (tungsten-cobalt-chromium alloy) of which cobalt is an ingredient. It is also employed in the production of ferro-magnetic alloys, but its uses in this respect fluctuate with progress of experimental research. The world production at the present time is probably of the order of 1,400 tons as compared with, say, 1,200 tons of the element in 1929. Detailed figures, however, are impossible to obtain. Sales are controlled by an association of producers, the metal being generally recovered as a by-product, principally from silver and copper ores. With the extension of uses and the consequent expansion of production it has been possible to reduce prices from 7s. or 8s. per pound in 1933 to 4s. 6d. and the policy of producers is to encourage experiments in the uses of the metal in every possible way. The leading producers to-day are Katanga, Del Oro, Rhokana and certain French interests in Morocco, which latter at present ship their product in the form of picked ore, while the older producers turn out a ferro-alloy. Quite recently a combine has been formed in Germany, where production is derived from a number of small producers, of which the Burma Corporation appears to be the largest, and this group forms a fifth element in the association. . . . the cobalt in the ore on the Mindola section (Rhodesia) of Rhokana is significant; according to a recent statement by Sir Edmund Davis, for the fourteen months to the end of August, 1934, the by-product cobalt recovered was 1,217,925 pounds valued at £318,310 13s. 0d." (The Mining Journal, London).

The Union Minière du Haut Katanga states in its annual report for 1934 that the cobalt market has developed substantially, the tonnage of sales being heavier than for any previous year.

Cobalt occurs as carrollite in the copper ore of the Nkana mine of the Rhokana Corporation, Northern Rhodesia.

Table 72.—Production of Cobalt from Canadian Ores, 1925-1934

Year	Pounds	Year	Pounds
1925.....	1,116,492	1930.....	694,163
1926.....	664,778	1931.....	521,051
1927.....	880,590	1932.....	490,631
1928.....	956,590	1933.....	466,702
1929.....	929,415	1934.....	594,671

NOTE.—For years 1904 to 1924 see previous reports.

Table 73.—Production in Canada, and Exports of Cobalt, 1932-1934

	1932		1933		1934	
	Pounds	\$	Pounds	\$	Pounds	\$
PRODUCTION— Cobalt, computed as cobalt in metal, oxides and salts sold, and in ores and residues exported.....	490,631	587,957	466,702	597,752	594,671	592,497
EXPORTS— Cobalt alloys, cobalt metallics, cobalt oxides, cobalt salts and cobalt ores.....		589,334		552,450		614,364

Table 74.—World Production of Cobalt, 1932-1934

(Supplied by *Imperial Institute*)

Country	1932	1933	1934
	Cwt.	Cwt.	Cwt.
BRITISH EMPIRE			
Canada (c).....	4,381	4,167	5,310
India (b).....	2,500	2,300	2,800
Australia (metal).....	60	125	160
Northern Rhodesia.....		2,330	11,429
FOREIGN COUNTRIES			
Belgian Congo (d).....	6,590	12,160	(a)
French Morocco.....	1,500	1,500	3,200
United States (e).....		11	(a)

NOTE.—Complex ores containing Cobalt are also found in Germany and China, but Cobalt content is not available.

(a) Data not yet available.

(b) Estimated Cobalt content of nickel-speiss exported to Hamburg.

(c) Metal recovered from smelter products plus Cobalt contained in Cobalt residues exported.

(d) Content of metal, oxide and salts produced at Oolen (Belgium) from material shipped from the Belgian Congo.

(e) Recovered at an electrolytic zinc plant.

Silver

By virtue of two Presidential Proclamations, the United States Government's buying price for newly mined domestic silver was raised to 77.57 cents an ounce on April 24, 1935. The proclamation, establishing that price, followed one made on April 10, that fixed the price at 71.11 cents. Necessity for the second proclamation, states the Engineering and Mining Journal, New York, developed when the world price of the metal advanced on April 24 to a level higher than that paid domestic producers. This last proclamation was the third made by President Roosevelt for the purpose of fixing the price of newly mined domestic silver, the first having been made on December 21, 1933; this earlier proclamation fixed the price of the metal at 64.64 cents an ounce.

The Mining Journal, London, comments on the silver situation as follows:—"One effect which deserves to be noted is that by nationalizing silver and putting a 50 per cent tax on all speculative transactions, the New York market has been entirely destroyed. The first development was the establishment of a silver exchange in Montreal, but as a result of the large amount of silver dealing which took place in London, a silver market was opened here (London) on the 1st of May, and with peculiar advantages which London offers as a centre for dealing in all the metals, it is probable that the open market which existed here up to 1913 may now become the recognized international centre for the silver trade." It is interesting to note that the London Metal Exchange has now adopted a "fine price" as the basis of its silver quotations, formerly the exchange quoted the price per troy ounce of standard silver based on the old standard of English coins (925 per mille).

The opinion of "Handy and Harman," New York, is that "the silver market will show great steadiness so long as the United States remains a buyer, and prices should tend to advance. It is impossible, however, to predict with accuracy the future price level, since this depends largely upon the volume and rate of United States Treasury Department purchases."

CANADIAN GOVERNMENT ACTION REGARDING SILVER

At the London Monetary and Economic Conference of July, 1933, important action was taken with a view to mitigating fluctuations in the price of silver. The Monetary and Financial Sub-Commission unanimously adopted a resolution recommending to all Governments, parties to the Conference, that, among other things, they refrain from further debasement of their silver coinage below a fineness of 800/1000 and that where possible they substitute silver coins for low-value paper currency.

In addition to the above recommendations of general applicability, definite agreements were entered into between the chief silver-holding countries and the main silver-producing nations. Under the Eight-Power Agreement, signed July 22, 1933, India and Spain agreed to limit total sales during the ensuing four years to 140 million and 20 million ounces respectively,

while China undertook during the same period to cease entirely selling silver from demonetized coins. On the other hand, the chief producing countries—Australia, Canada, Mexico, Peru and the United States—agreed not to sell any silver but to make aggregate purchases from (or otherwise arrange for withholding from market) domestic production totalling 35 million ounces annually. Under a separate Five-Power Agreement, of the same date, Canada accepted the quota of 1,671,802 ounces as her share of the total amount to be so purchased (or otherwise withheld from sale). The action of the delegate of Canada in signing this agreement at London was approved by Parliament on February 26, 1934.

In 1934 the Minister of Finance purchased 1,671,802 ounces of newly mined Canadian silver. This silver was purchased by tender or by agreement from the mines at the price prevailing for silver at the time of purchase. This silver was held as additional security for the redemption of Dominion notes in accordance with an amendment to the Dominion Notes Act of June 26, 1934.

On March 11, 1935, when the Bank of Canada commenced operations the silver then held by the Government was transferred to that institution, which assumed the liability of the Dominion notes outstanding. The silver transferred to the Bank of Canada and future purchases by it will form part of the reserve of the Bank of Canada (Section 26 (a), Bank of Canada Act). On July 24, 1935, the Bank of Canada reported in its weekly statement silver bullion held as \$1,211,642.30.

It is of interest to note that the Royal Canadian Mint, Ottawa, coined and issued the first Canadian silver dollars on April 17, 1935; the weight of this coin is 360 grains, 8/10 fine silver.

Table 75.—Production of Silver in Canada, by Provinces and by Sources, 1933 and 1934

	1933		1934	
	Quantity	Value	Quantity	Value
	fine oz.	\$	fine oz.	\$
NOVA SCOTIA—				
In gold bullion—Total.....	104	39	321	152
QUEBEC—				
In gold ores, in blister copper, and in copper ores exported—Total....	471,419	178,351	470,254	223,187
ONTARIO—				
In silver bullion and nuggets.....	2,762,748	1,045,225	2,681,104	1,272,476
In gold bullion.....	404,744	153,126	418,528	198,637
In blister copper produced; and in ores, concentrates, residues and matte exported or treated in smelters outside the province.....	1,368,188	517,624	2,221,528	1,054,357
Total.....	4,535,680	1,715,975	5,321,160	2,525,470
MANITOBA—				
In gold bullion and in blister copper—Total.....	1,101,578	416,758	1,252,920	594,647
SASKATCHEWAN—				
In ores shipped to Canadian smelters—Total.....	114,604	43,358	87,551	41,552
ALBERTA—				
In alluvial gold—Total.....	32	12	35	17
BRITISH COLUMBIA—				
In alluvial gold.....	4,307	1,629	4,533	2,152
In gold bullion.....	26,579	10,056	44,707	21,218
In blister copper.....	346,120	130,947	344,425	163,467
In base bullion and in ores exported.....	6,360,051	2,406,185	8,336,056	3,956,367
Total.....	6,737,057	2,548,817	8,729,721	4,143,204
YUKON AND NORTHWEST TERRITORIES—				
In alluvial gold.....	8,814	3,335	8,708	4,133
In ores exported or shipped to Canadian smelters.....	2,218,662	839,382	544,612	258,478
Total.....	2,227,476	842,717	553,320	262,611
Canada.....	15,187,950	5,746,027	16,415,282	7,790,840

For 1934 fine silver was valued at 47.4609 cents per ounce, the average price for the metal on the New York market expressed in Canadian funds; for 1933 the corresponding price was 37.8328 cents.

Table 76.—Production of Silver in Canada for Years Specified, 1887-1934

Year	Ounces	Cents per ounce	Year	Ounces	Cents per ounce
1887.....	355,083	98-00	1924.....	19,736,323	66-78
1891.....	414,523	98-00	1925.....	20,228,988	69-06
1896.....	3,205,343	67-06	1926.....	22,371,924	62-11
1901.....	5,539,192	58-95	1927.....	22,736,698	56-37
1906.....	8,473,379	66-79	1928.....	21,936,407	58-18
1910*.....	32,869,264	53-49	1929.....	23,143,261	52-99
1911.....	32,559,044	53-30	1930.....	26,443,823	38-15
1916.....	25,459,741	65-66	1931.....	20,562,247	29-87
1919.....	16,020,657	(a) 111-122	1932.....	18,347,907	31-67
1920.....	13,330,357	100-90	1933.....	15,187,950	37-83
			1934.....	16,415,282	47-46

*Year of maximum output.

(a) Highest price per ounce recorded since 1887.

From 1887 to 1934 inclusive the silver production of Canada amounted to 680,351,369 fine ounces valued at \$406,298,812.

For a complete record of annual production see previous reports.

Table 77.—Production of Silver by Principal Silver-producing Provinces, 1925-1934

(For the years 1887 to 1924 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		Manitoba		British Columbia		Yukon Territory	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
		\$		\$		\$		\$		\$
1925.....	214,943	148,451	10,529,131	7,271,944	477	329	8,579,458	5,925,403	904,893	624,964
1926.....	375,986	233,513	9,274,965	5,760,402	18	11	10,625,816	6,599,376	2,095,027	1,301,159
1927.....	740,864	417,625	9,307,953	5,246,893	12	7	11,040,445	6,223,499	1,647,295	928,580
1928.....	908,959	528,796	7,242,601	4,213,456	1,763	1,026	10,943,367	6,366,413	2,839,633	1,651,985
1929.....	813,821	431,268	8,890,726	4,711,462	2,644	1,401	10,156,408	5,382,185	3,279,530	1,737,922
1930.....	571,164	217,922	10,205,683	3,893,876	94,653	36,114	11,825,930	4,512,065	3,746,326	1,429,373
1931.....	530,345	158,414	7,438,951	2,222,014	836,547	249,877	8,061,599	2,408,000	3,694,728	1,103,615
1932†.....	628,902	199,184	6,335,788	2,006,648	1,036,497	328,275	7,293,462	2,309,958	3,053,188	966,994
1933.....	471,419	178,351	4,535,680	1,715,975	1,101,578	416,758	6,737,057	2,548,817	2,227,476	842,717
1934.....	470,254	223,187	5,321,160	2,525,470	1,252,920	594,647	8,729,721	4,143,204	553,320	262,611

†Northwest Territories production included with Yukon since 1932.

For data relating to silver in mine shipments from Cobalt District and nearby camps in Ontario, see previous reports.

In 1934 Saskatchewan was credited with 87,551 fine ounces valued at \$41,552, representing the estimated metal recovered from that part of the Flin Flon mine situated in Saskatchewan.

Table 78.—Source of Canadian Silver Production by Percentages, 1932 to 1934

	1932	1933	1934
In silver-cobalt ores.....	28-5	20-4	18-7
*In base bullion.....	29-2	34-6	45-1
In gold ores (bullion and placer).....	2-5	3-0	7-2
In blister copper.....	15-5	19-5	23-4
In matte, copper ores and silver-lead ores exported, etc.....	24-3	22-5	5-6
	100-0	100-0	100-0

*Chiefly from silver-lead ores.

Table 79.—Comparative Copper, Silver and Lead Production in Canada for Years Specified

Year	Total copper production, Canada	(*) Silver, Ontario	Total lead production, Canada	Total silver production, Canada
	Pounds	Fine oz.	Pounds	Fine oz.
1907.....	56,979,205	10,023,311	47,738,703	12,779,799
1911.....	55,648,011	(†) 31,507,791	23,784,969	32,559,044
1915.....	100,785,150	24,746,534	46,316,450	26,625,960
1919.....	75,033,581	11,214,317	43,827,699	16,020,657
1923.....	86,881,537	10,377,846	111,234,466	18,601,744
1924.....	104,457,447	9,935,902	175,485,499	19,736,323
1925.....	111,450,518	10,707,235	253,590,578	20,228,988
1926.....	133,094,942	10,543,473	283,801,265	22,371,924
1927.....	140,147,440	8,543,513	311,423,161	22,736,698
1928.....	202,696,046	6,745,401	337,946,688	21,936,407
1929.....	248,120,760	7,781,429	326,522,566	23,143,261
1930.....	303,478,356	9,225,610	332,894,163	26,443,823
1931.....	292,304,390	5,998,482	267,342,482	20,562,247
1932.....	247,679,070	4,659,304	255,947,378	18,347,907
1933.....	299,982,448	3,641,930	266,475,191	15,187,950
1934.....	364,761,062	3,029,638	346,275,576	16,415,282

(*) Shipments from silver-cobalt camps as recorded by Ontario Department of Mines—Total output from these fields 423,771,151 ounces—1904-1934 inclusive.

(†) Year of maximum production.

Table 80.—Average Commercial Ratio of Silver to Gold for Each Specified Year Since 1700(Supplied by *United States Mint*)

Year	—	Year	—	Year	—
1700.....	14.81	1885.....	19.41	1920.....	20.28
1750.....	14.55	1890.....	19.75	1925.....	29.78
1800.....	15.68	1895.....	31.60	1930.....	53.74
1850.....	15.70	1900.....	33.33	1931.....	71.25
1875.....	16.64	1905.....	33.87	1932.....	73.29
1880.....	18.05	1910.....	38.22	1933.....	59.06
		1915.....	40.48	1934†.....	72.69

†Estimated on averages in Canadian funds.

Table 81.—Imports into Canada and Exports of Silver, 1933 and 1934

	1933		1934	
	Quantity	Value	Quantity	Value
	Fine oz.	\$	Fine oz.	\$
IMPORTS—				
Silver in bars, etc., unmanufactured.....		675,732		2,193,201
Silver, manufactures of, n.o.p., and articles consisting wholly or in part of sterling or other silverware.....		73,666		67,425
Silver and other coin except gold.....		12		
Total.....		749,410		2,260,626
EXPORTS—				
Silver contained in ore, concentrates, etc.....	3,362,354	1,093,464	1,745,152	714,444
Silver bullion.....	10,738,729	3,759,387	10,664,182	4,933,690
Total.....	14,101,083	4,852,851	12,409,334	5,648,134
Silver coin, foreign.....		275,007		615,665
Silver coin, Canadian.....		62,943		30,250

Table 82.—Monthly Average Prices of Silver, 1932-1934(From the *Engineering and Mining Journal*)

Month	New York (Cents per fine ounce) ·999 fine			London Spot (Pence per standard ounce) ·925 fine		
	1932	1933	1934	1932	1933	1934
January.....	29.780	25.400	44.188	19.623	16.883	19.382
February.....	30.136	26.074	45.233	19.573	16.885	20.073
March.....	29.810	27.928	45.875	18.336	17.588	20.278
April.....	28.298	30.730	45.180	16.923	18.440	19.740
May.....	27.755	34.072	44.226	16.868	19.046	19.276
June.....	27.466	35.663	45.173	16.844	19.078	19.981
July.....	26.700	37.630	46.310	16.930	18.341	20.512
August.....	27.986	36.074	48.986	18.000	17.877	21.377
September.....	27.870	38.440	49.484	17.998	18.272	21.888
October.....	27.195	38.190	52.375	17.813	18.221	23.531
November.....	26.698	41.974	54.255	18.099	18.428	24.257
December.....	25.010	43.550	54.390	17.110	18.674	24.404
Average.....	27.892	34.727	47.973	17.843	18.144	21.229

The average yearly price of silver in Canadian funds during 1932, computed from daily New York quotations was 31.67163 cents per troy ounce. The average price of silver in Canadian funds based on the New York market in 1933 was 37.8328 cents per fine ounce, and in 1934, 47.4609 cents.

Table 83.—Comparative Figures of Silver Production, for the World, Mexico, the United States, Peru, and Canada, 1925-1934

Year	World's Output*	Mexico's Output*	United States Output*	Peru's Output*	Canada's Output
	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1925.....	245,213,993	92,885,465	66,106,922	19,917,439	20,228,988
1926.....	253,795,166	98,291,166	62,672,953	21,499,798	22,371,924
1927.....	251,096,555	104,573,919	60,394,199	18,295,408	22,736,698
1928.....	257,925,154	108,537,307	58,426,004	21,607,693	21,936,407
1929.....	260,870,029	108,871,442	61,233,321	21,495,169	23,143,261
1930†.....	247,000,000	105,204,059	47,724,903	14,372,593	26,443,823
1931.....	197,000,000	86,064,457	29,856,628	8,794,407	20,562,247
1932 (a).....	165,000,000	69,303,119	22,739,681	3,518,753	18,347,907
1933 (a).....	170,000,000	68,101,062	23,128,783	7,595,180	15,187,950
1934 (a).....	191,000,000	74,143,301	32,514,118	11,338,212	16,415,282

* Prior to 1930 from Annual report of the "Director of the Mint," Washington.

† Beginning with 1930, figures from the Imperial Institute.

(a) Excluding the production of U.S.S.R. (Russia), figures for which are not available.

NOTE.—For years 1898 to 1924 see previous reports.

Table 84.—World Production of Silver Ore, 1932-1934

(In terms of metal)

(Supplied by *Imperial Institute*)

(Fine ounces)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES— Con.			
United Kingdom.....	16,043	37,553	138,974	Hungary.....	12,814	19,186	13,668
Bechuanaland Protectorate.....	1,676	622	957	Spain.....	3,374,335	2,929,508	1,788,247
Gold Coast (estimated).....	9,000	10,000	11,000	Belgian Congo.....	1,887,687	2,646,650	3,399,541
Kenya.....	1,118	1,613	1,969	Sweden.....	668,849	928,203	754,496
Nigeria.....	85,368	117,480	81,000	Algeria.....	58,835	27,300	37,000
Northern Rhodesia.....	339	25	187	Morocco (Spanish).....	10,330	6,870	(a)
Southern Rhodesia.....	114,555	112,434	128,381	Mozambique.....	257	224	763
South West Africa (d).....	165,000			Tunis.....	5,859	3,858	22,184
Tanganyika Territory.....	3,313	3,891	4,876	Mexico.....	69,303,119	68,101,062	74,143,301
Union of South Africa.....	1,120,668	1,065,011	1,002,203	United States.....	22,739,681	23,128,783	32,514,118
Canada.....	18,347,907	15,187,950	16,415,282	Guatemala (c).....	143,500	26	19,068
British Guiana (estimated).....	1,830	3,070	3,340	Honduras.....	3,697,017	3,911,686	3,091,522
India.....	6,026,737	6,080,241	5,817,524	Nicaragua (c).....	55,375	20,859	45,241
Federated Malay States (estimated).....	2,400	2,600	2,700	Salvador.....	(c) 4,822	(c) 174	4,848
Australia.....	9,460,369	10,817,162	11,357,091	Argentina (b).....	50,000	50,000	60,000
New Zealand.....	562,792	430,492	382,615	Bolivia (exports).....	4,115,232	5,469,069	5,216,177
Newfoundland.....	1,333,998	1,208,280	1,103,091	Brazil.....	21,638	23,393	22,275
Sierra Leone (estimated).....	3,000	4,000	6,533	Chile.....	73,422	255,078	1,053,073
Total.....	37,000,000	35,000,000	36,000,000	Colombia.....	84,000	108,005	127,000
FOREIGN COUNTRIES				Ecuador.....	114,167	113,200	110,000
Austria.....	18,785	39,062	28,189	Guiana (French and Dutch) (estimated).....	4,200	6,000	6,000
Czechoslovakia.....	1,059,969	980,716	982,422	Peru.....	6,773,733	7,316,828	10,381,397
France.....	410,877	300,602	300,506	Venezuela (b).....	6,000	6,000	7,000
Germany.....	5,993,499	6,320,700	5,944,021	China.....	134,000	122,000	(a)
Greece.....	137,783	593,730	(a)	Formosa.....	174,100	170,000	(a)
Italy.....	394,304	342,639	365,600	French Indo-China.....			3,500
Yugoslavia.....	2,018,100	2,055,000	2,216,000	Japan.....	5,260,556	5,967,370	6,984,729
Norway.....	314,781	252,493	200,096	Korea.....	620,000	750,000	1,050,000
Poland.....	69,283	41,377	21,090	Netherlands East Indies.....	842,365	860,462	773,999
Roumania.....	186,727	353,489	388,018	Philippine Islands.....	160,177	170,042	226,524
				Total*.....	131,000,000	135,000,000	153,000,000
				World's Total*.....	168,000,000	170,000,000	189,000,000

* Excluding the production of U.S.S.R. (Russia), figures for which are not available.

(a) Information not available.

(b) Estimates of United States Mint.

(c) Imported into the United States from the country indicated.

(d) Years ended March 31, of the year following that stated.

Table 85.—World Silver Consumption, Production and Other Supplies*, 1933-1934

(In millions of fine ounces)

Consumption	1933	1934	Production and Supplies	1933	1934
U.S. Government Acquisitions:			Production:		
Domestic production.....		21.4	United States.....	21.0	25.5
Nationalized stocks.....		111.0	Mexico.....	69.1	75.0
Open market purchases.....	1.0	185.0	Canada.....	15.4	16.3
War debt payments.....	22.7		South America.....	13.6	16.0
			All other countries.....	45.0	48.4
	23.7	317.4	Total Production.....	164.1	181.2
Other Government Purchases:			Other Supplies:		
Mexico.....	16.0	7.2	Sales by China, excess of exports		
Canada.....		1.7	over imports.....	10.9	200.0
Peru.....		1.1	Sales by Indian Government:		
Australia.....		0.6	a/c British war debt.....	20.0	
Coinage:			In London.....	27.1	30.0
Hong Kong.....		9.0	Sales by Russia.....	45.8	25.0
Cuba.....		7.8			
Colombia.....		3.6			
Belgium.....	7.0				
Turkey.....	4.5				
Other countries.....		0.6			
Indian consumption.....	10.0	15.0			
German consumption.....	14.5	12.4			
Arts and Industries:					
In the United States and Canada....	24.0	25.0			
In England.....	8.0	13.0			
Unaccounted for.....	160.2	(a) 21.8			
Total.....	267.9	436.2		267.9	436.2

* Supplied by Handy & Harman.

(a) "In assembling the above estimates covering 1934 world supply and demand, we arrive at a total of 436,200,000 ounces for the former classification and 414,400,000 ounces for the latter, which leaves a balance of excess supplies amounting to 21,800,000 ounces, and this figure we have listed under the heading "unaccounted for". It must not be inferred, however, that these 21,800,000 ounces represent the entire floating supply of silver now available, even though the huge speculative holdings which existed in New York at the beginning of 1934 have been absorbed by the United States Government. Speculators have transferred their operations to London, and a large long position has been built up in that market, consisting of both future commitments and the actual metal. Naturally it is difficult to secure accurate information on this subject, but estimates from abroad set the figure as high as 150,000,000 ounces. Stocks in Bombay increased during the year from 10,000,000 ounces to about 15,000,000 ounces, and the present volume of trading on the Montreal Commodity Exchange necessitates a supply there of at least 3,000,000 ounces. In addition to holdings of China banks and the Indian Government covered by published figures, another potential source, unpredictable as to the amount, is the metal hoarded in the interior of the Far East."

Table 86.—World's Monetary Stocks of Silver at the Close of 1933

(Supplied by *United States Mint* and subject to revision)

(Stated in United States money, 000's omitted)

Country	Silver stock in banks and treasuries	Per capita
	\$	\$
United States.....	839,961	6.73
Canada.....	28,032 (1)	2.71
Mexico.....	60,563	3.66
Chile.....	3,249 (3)	0.73
Colombia.....	11,243 (1)	1.27
Peru.....	5,069 (1)	0.81
Venezuela.....	16,399 (1) (3)	5.02
Austria.....	10,069 (1) (2)	1.49
Belgium.....	9,483 (2) (3)	1.16
France.....	109,599 (1)	2.62
Germany.....	321,086 (1)	4.98
Great Britain.....	260,559 (1)	5.64
Greece.....	2,540 (3)	0.39
Irish Free State.....	6,096 (1)	2.05
Italy.....	86,488 (1) (2)	2.06
Latvia.....	8,298 (1)	4.32
Netherlands.....	10,598 (3)	1.29
Norway.....	1,903 (1)	0.67
Poland.....	31,588 (1)	0.98
Roumania.....	1,114	0.05
Russia (Soviet Union).....	4,729 (5) (6)	0.02
Spain.....	124,306	5.27
Switzerland.....	37,712 (1)	9.15
Yugoslavia.....	17,600 (1)	1.26
Ceylon.....	9,981 (1)	1.87
China.....	667,459 (8) (7)	1.45
India—British.....	1,377,876 (1)	3.90
Iraq (Mesopotamia).....	25,000 (1) (2)	7.60
Japan (including Chosen, Taiwan, Kwantung).....	40,887 (7)	0.44
Netherlands East Indies.....	13,914	0.22
Philippine Islands.....	18,862 (1)	1.51
Siam.....	23,963	2.05
Straits Settlements.....	21,371 (1) (2)	19.18
Egypt.....	21,677 (1)	1.45
Ethiopia.....	11,316 (1)	1.13
Kenya and Uganda.....	11,912 (1) (4)	1.82
Sudan—Anglo Egyptian.....	8,797 (1)	1.56
Union of South Africa.....	11,927 (1)	1.46
Australia.....	35,749 (2)	5.47
Tanganyika.....	8,885 (1)	1.81
Others.....	96,821	.....
Total	4,414,681	2.29

NOTE.—The amount of silver in circulation in many countries is not obtainable, and in some countries that held by private banks cannot be given.

(1) Estimated silver circulation included.

(2) Prior year's figures.

(3) Includes base metal coin.

(4) June 30, 1933.

(5) On January 1, 1934.

(6) Includes platinum.

(7) Incomplete.

(8) Dollar coins circulating estimated at 2,300,000,000.

Table 87.—Silver Content of Principal World Coins

Coin	Country	Fine silver content— grains
Dollar.....	United States.....	371-250
Dollar.....	Canada.....	288-000
Shilling (new).....	Great Britain.....	43-636
5 Lira (new).....	Italy.....	64-430
2 Zloty (new).....	Poland.....	50-927
Schilling (new).....	Austria.....	59-260
10 Franc (new).....	France.....	104-940
Mark (a).....	Germany.....	38-581
Rouble (new).....	Russia.....	277-782
Ruppee.....	India.....	165-000
Yuan.....	China.....	362-552

LEAD CANADA

Canada's lead production includes (a) lead contained in ores and concentrates exported, less deductions for smelter losses, valued at the average price in London for the year; (b) the lead contained in the base bullion made by the Consolidated Mining and Smelting Company, Ltd., at Trail, B.C., and the lead in a silver-lead-bismuth bullion produced at the Deloro smelter in Ontario, valued at the average price in London for the year.

Production in 1934 included lead recovered from silver-cobalt ores mined in Ontario, lead from the Sullivan mine in East Kootenay, British Columbia, and from several other properties producing in the Slocan, Portland canal and other districts of the same province. Important quantities of lead were contained in silver-lead concentrates exported from the Yukon by the Treadwell-Yukon Mining Company; silver ore was also shipped from the Northwest Territories in 1934.

Previous to 1904, lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces to a base bullion which was exported for refining. A lead refinery employing the Betts electrolytic process has been in operation at Trail, B.C., since 1904; this refinery treats the product from the Consolidated Mining and Smelting Company's blast furnaces. A great advance in 1931 at Trail was made in the lead smelting plant through the operation of the new slag-fuming installation.

Canadian lead production during 1934 represented a 29.9 per cent increase in quantity and 32.4 per cent in value over that of the preceding year. These were accounted for through the expanding output in British Columbia and a slight improvement in lead prices. Decreases for the corresponding periods were recorded for both the Yukon and Ontario. Of the total Canadian production, British Columbia contributed 99.5 per cent, and the total quantity of lead produced in the Dominion during 1934 represents an all time high record in the history of Canadian lead production.

Important quantities of lead are consumed in the storage battery, cable and pigments industries; The American Bureau of Metal Statistics shows the use of lead in the United States in 1934 by percentages as follows: cable covering, 7.15 per cent; storage batteries, 34.19 per cent; white lead, 13.53 per cent; building, 6.29 per cent; ammunition, 7.30 per cent; red lead and litharge, 5.87 per cent; foil, 3.40 per cent; and the balance in solder, bearing metals, etc.

It may prove of interest to note that "Chemical and Metallurgical Engineering" announces that a new type of lead alloy is now available possessing all the characteristics of ordinary lead and having some new valuable properties in addition. Tellurium produces a marked change in the physical structure of lead, which results in a lead of greater resistance to corrosion by acid, greater tensile strength, greater resistance to fatigue failure resulting from vibration of some repeated stresses, and it also has better working qualities.

Table 88.—Production of Lead from Canadian Ores, 1925-1934

Year	Pounds	Value	Price per pound in cents*	Year	Pounds	Value	Price per pound in cents*
		\$				\$	
1925†.....	253,590,578	23,127,460	9.120	1930.....	332,894,163	13,102,635	3.927
1926.....	283,801,265	19,240,661	6.751	1931.....	267,342,482	7,260,183	2.710
1927.....	311,423,161	16,477,139	5.256	1932.....	255,947,378	5,409,704	2.114
1928.....	337,946,688	15,553,231	4.576	1933.....	266,475,191	6,372,998	2.392
1929.....	326,522,566	16,544,248	5.054	1934 (a).....	346,276,576	8,436,658	2.436

The data given represent the quantity of lead produced in Canada from domestic ores, together with the estimated lead recovery from lead ores and concentrates exported.

NOTE.—For years 1887 to 1924 see previous reports.

*In Canadian funds.

†Year of maximum value of Canadian lead production.

(a) Year of maximum output of Canadian lead.

Table 89.—Production of Lead from Canadian Ores, by Provinces, 1925-1934

(For years 1887 to 1924 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		British Columbia		Yukon and Northwest Territories	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$		\$
1925.....	2,051,100	187,060	7,209,534	657,510	242,454,502	22,111,850	1,875,442	171,040
1926.....	3,729,636	251,788	7,398,795	580,730	266,812,461	18,012,509	5,860,373	395,634
1927.....	6,496,577	341,461	7,990,709	528,729	292,770,544	15,388,020	4,165,331	218,929
1928.....	6,218,336	284,520	6,814,757	402,289	317,722,146	14,537,377	7,191,449	329,045
1929.....	5,358,304	270,616	4,769,506	294,431	307,999,153	15,555,189	8,395,603	424,012
1930.....			2,193,856	116,034	321,803,725	12,637,232	8,896,582	349,369
1931.....			985,633	41,647	261,902,236	7,097,812	4,454,613	120,724
1932.....			86,477	1,828	252,007,574	5,326,432	3,853,327	81,444
1933.....			29,910	692	263,345,776	6,298,178	3,099,505	74,128
1934.....			21,558	525	344,467,138	8,392,597	1,786,880	43,536

Production of lead from Canadian ores from 1887 to 1934 inclusive totals 4,432,337,106 pounds valued at \$216,509,909.

Table 90.—Refined Lead Production in Canada,* 1925-1934

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1925.....	213,217,605	1930.....	304,471,706
1926.....	257,273,585	1931.....	278,448,457
1927.....	295,766,327	1932.....	253,136,522
1928.....	301,067,819	1933.....	254,565,861
1929.....	304,449,673	1934.....	†314,457,735

*Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C.; and also the pig lead from Galletta, Ont., until 1931.

†Primary lead only.

NOTE.—For years 1904 to 1924 see previous reports.

Table 91.—Available Statistics on the Consumption of Lead Metal in Specified Canadian Manufacturing Industries, 1933 and 1934

Industries	Items (Used)	1933	1934
		Pounds	Pounds
Brass and copper products.....	Pig lead.....	204,153	631,928
	Scrap and other lead.....	71,000	119,275
Paints and pigments.....	Pig lead.....	10,771,975	12,569,302
White metal alloys.....	Pig lead, etc.....	7,138,622	8,759,089
	Scrap lead.....	13,593,415	9,780,366
Electrical apparatus.....	Pig lead.....	9,480,166	13,211,023
	Scrap lead.....	185,202	166,684
	Lead sheets, etc.....	612,993	556,427
Iron and steel.....	Lead.....	1,072,660	915,285
Grand Total.....		43,130,186	46,689,379

Table 92.—Imports into Canada and Exports of Lead, 1933 and 1934

	1933		1934	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Old and scrap, pig and block.....	15,038	1,148	102,294	3,921
Bars and sheets.....	88,607	3,820	59,877	2,500
Litharge.....	1,885,300	100,816	1,689,100	91,975
Acetate of lead (not ground).....	102,747	7,897	151,635	11,860
Nitrate of lead (not ground).....	40,385	2,120	243,110	12,504
Other manufactures.....		63,723		78,064
Pipe lead.....	10,686	658	7,254	336
Shots and bullets.....	5,327	340	14,187	939
Tea lead.....	200	12		
Lead arsenate.....	498,673	44,256	450,748	37,788
Lead tetraethyl, compounds of.....	1,571,775	1,212,990	1,821,083	1,053,503
Lead pigments—				
Dry white lead.....	8,880	599	152,409	9,827
White lead, ground in oil.....	21,250	2,540	16,258	1,706
Dry red lead and orange mineral.....	611,696	32,596	544,597	32,397
Total.....		1,473,515		1,337,320
EXPORTS—				
Lead, contained in ore, etc.—				
To United States.....	4,062,000	161,665	1,918,300	76,726
Belgium.....	3,538,000	106,140	21,726,500	432,780
Total lead in ore.....	7,600,000	267,805	23,644,800	509,506
Pig lead, refined lead, etc.—				
To United Kingdom.....	172,653,900	3,047,227	162,055,700	2,963,356
United States.....				
Japan.....	72,955,200	1,190,362	90,887,500	1,706,885
Netherlands.....	4,984,200	94,113	2,195,200	44,120
China.....	7,760,500	125,098	9,963,200	181,222
Brazil.....	4,099,200	70,608	6,184,000	114,712
Germany.....	7,468,600	152,652	1,797,200	35,155
Other countries.....	14,407,800	262,454	10,076,200	192,753
Total pig lead.....	284,329,400	4,922,514	283,159,000	5,238,203
Total Lead Exports.....	291,929,400	5,190,319	306,803,800	5,747,709

Table 93.—Monthly Average Prices of Pig Lead, Montreal,* New York and London,† 1932-1934

Month	Montreal (Value in cents per pound)			New York (Value in cents per pound)			London† (Value in pounds sterling per long ton)		
	1932	1933	1934	1932	1933	1934	1932	1933	1934
January.....	4.260	3.262	3.924	3.750	3.000	4.000	15.084	10.458	11.304
February.....	4.148	3.400	3.983	3.712	3.000	4.000	14.560	10.431	11.634
March.....	3.850	3.459	4.152	3.150	3.146	4.000	12.345	10.609	11.545
April.....	3.609	3.416	4.139	3.000	3.260	4.179	11.223	10.872	11.500
May.....	3.320	3.636	4.294	3.000	3.654	4.140	10.673	12.095	11.051
June.....	3.145	3.933	4.637	2.993	4.173	3.975	9.608	13.280	11.054
July.....	3.088	4.174	5.095	2.747	4.452	3.772	9.818	13.411	10.813
August.....	3.217	3.889	4.809	3.235	4.500	3.747	11.349	12.182	10.821
September.....	3.482	3.848	4.802	3.465	4.500	3.685	13.122	11.932	10.388
October.....	3.264	3.688	4.657	3.052	4.313	3.654	11.958	11.804	10.359
November.....	3.373	3.848	4.643	3.050	4.288	3.567	12.071	11.537	10.432
December.....	3.386	3.903	4.720	3.000	4.141	3.604	11.144	11.431	10.316
Average.....	3.511	3.705	4.488	3.180	3.869	3.860	11.913	11.670	10.935

*Producers' prices for car load quantities ex-cars Montreal, as furnished by the Consolidated Mining and Smelting Company.

†From the Engineering and Mining Journal.

‡The average price of lead for 1932, based on daily quotations in London and transposed to Canadian funds, was 2.1136 cents per pound, the average price of lead, based on the same market, was 2.3916 cents per pound for 1933 and 2.4361 cents for 1934.

Table 94.—World Production of Lead Ore, 1932-1934

(Supplied by Imperial Institute)

(In terms of metal)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom....	32,913	39,735	53,816	—Concluded			
Nigeria.....	440	636	440	Poland.....	5,000	5,000	6,000
N. Rhodesia (smelter).....		73	184	Portugal.....	101	209	3
S.W. Africa (b).....	5,000			Roumania.....	2,803	3,131	2,729
Union of S. Africa.....	68	86	71	U.S.S.R. (smelter)...	18,500	13,455	26,563
Canada (c).....	114,262	118,962	154,587	Spain (smelters)....	103,706	82,175	72,000
Newfoundland.....	35,593	34,374	37,227	Sweden.....	7,193	7,401	8,118
India.....	78,800	96,100	88,800	Algeria.....	1,924	384	700
Australia.....	210,566	221,889	229,825	Morocco (French)...	1,750	20	192
Total.....	480,000	510,000	565,000	Tunis.....	6,289	3,700	5,100
FOREIGN COUNTRIES				Mexico (c).....	135,231	116,818	163,706
Austria.....	4,735	6,209	5,183	United States (c)...	261,579	243,462	255,945
Bulgaria (estimated).....		350	350	Argentina.....	2,748	(a)	(a)
Czechoslovakia.....	4,171	3,830	3,428	Bolivia (exports)....	5,402	7,721	11,023
Finland.....	292	333	246	Brazil (estimated)...	500	150	(a)
France.....	3,169	1,230	876	Chile.....	(a)	32	(a)
Germany.....	50,145	52,813	57,995	Peru.....	4,527	1,918	8,959
Greece.....	6,800	13,200	(a)	China.....	3,136	3,156	(a)
Hungary.....		10	(a)	French Indo-China....			7
Italy.....	21,273	17,625	18,800	Japan (smelter)....	6,313	6,717	6,928
Yugoslavia.....	48,681	60,146	69,062	Turkey.....		2,200	(a)
Norway.....	844	806	492	Morocco (Spanish)...	915	609	(a)
				Guatemala.....	164	(a)	(a)
				Total.....	700,000	660,000	750,000
				World's total....	1,180,000	1,170,000	1,310,000

(a) Information not available.

(b) Years ended March 31 of the year following that stated.

(c) Amount estimated as recoverable.

Table 95.—World Metal Production of Lead, 1932-1934

(Supplied by Imperial Institute)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom....	7,000	5,500	9,000	—Concluded			
S.W. Africa (d).....	1,028	402		Yugoslavia.....	8,190	6,219	9,969
Canada.....	113,007	113,645	140,383	Norway.....	428	359	328
India.....	71,202	72,045	71,815	Poland.....	11,714	11,845	10,187
Australia (e).....	186,356	205,264	196,005	Portugal.....	107	65	53
N. Rhodesia.....		73	184	Roumania.....	1,907	4,018	4,387
Total.....	379,000	397,000	417,000	U.S.S.R. (Russia)...	18,500	13,455	26,563
FOREIGN COUNTRIES				Spain.....	103,706	86,959	71,011
Austria.....	1,955	4,552	5,540	Sweden.....	38		
Belgium (b).....	63,147	68,294	73,569	Tunis.....	13,860	14,638	26,880
Czechoslovakia.....	4,059	3,751	4,002	Mexico.....	135,157	117,700	168,000
France.....	19,298	20,100	17,582	United States.....	247,396	233,654	276,858
Germany (c).....	104,731	130,000	122,022	Argentina.....	9,100	11,900	19,000
Greece.....	6,380	8,075	8,000	Peru.....	135	394	1,959
Hungary.....		10	41	French Indo-China....	16	13	15
Italy.....	30,974	24,365	47,087	Japan.....	6,313	6,717	6,928
				Korea.....	485	771	1,777
				Total.....	790,000	770,000	900,000
				World's Total....	1,170,000	1,170,000	1,320,000

(a) Information not available.

(b) Includes base bullion as follows:—

1932..... 6,476 long tons.

1933..... 7,687 " "

1934..... 7,972 " "

(c) Includes some secondary. Figures as published by metallgesellschaft, which exclude secondary, are:—

1932..... 93,700 long tons.

1933..... 114,800 " "

1934..... 118,000 " "

(d) Years ended March 31 of the year following that stated.

(e) Includes base bullion as follows:—

1932..... 51,857 long tons.

1933..... 45,871 " "

1934..... 35,804 " "

ZINC

Refined zinc is produced at Trail, British Columbia, by the Consolidated Mining and Smelting Company, Limited, from ores mined chiefly in British Columbia; in 1930 a new electrolytic zinc refinery was brought into production at Flin Flon, Manitoba, by the Hudson Bay Mining and Smelting Company, Limited; the plants of both of these companies were in continuous operation throughout 1934.

No primary zinc was produced in 1934 in Nova Scotia, Quebec or Ontario. The Manitoba and Saskatchewan output came entirely from ores treated at the Flin Flon plants while in British Columbia some of the principal producers of zinc ores in the order of their output were the Sullivan, Monarch, Britannia, Bosun, Highland Lass and Wellington.

Figures for the total Canadian production of zinc are compiled by adding the quantities of refined zinc made at Trail and Flin Flon to the amount of zinc estimated as recoverable from ores and concentrates exported; the value of production is usually calculated at the monthly average price for zinc on the London market for the year, expressed in Canadian funds. In 1934, using the average monthly rate of exchange, the average value of zinc for the year in Canadian funds was 3.04 cents per pound.

Zinc output in the Dominion in 1934 realized a 49.9 per cent increase in quantity and 42.1 per cent increase in value over 1933 and the tonnage was the greatest ever recorded in the history of Canadian zinc production. Of the total output British Columbia contributed 83.4 per cent, Manitoba 15.8 per cent and Saskatchewan 0.7 per cent.

Commenting in May, 1935, on the world zinc situation, the Mining Journal, London, says: "It would appear as though producers, accustomed to the high price level of the immediate pre-war and post-war years, required the stimulus of the depression to take full advantage of the technical improvements in methods of production which had been achieved during these years. Now that the majority of producers can operate profitably with zinc say £13, the way is open for a considerable expansion of consumption without the stimulus to new producers to enter the industry which was provided by the high price levels ruling in previous years."

The American Bureau of Metal Statistics reports the following as the estimated manufacture of zinc by percentage in the United States during 1922, 1932, 1933 and 1934.

	1922	1932	1933	1934
Galvanizing.....	46.69	42.08	42.25	42.23
Brass making.....	32.97	25.48	26.83	27.23
Rolled zinc.....	12.16	15.45	11.79	11.37
Die castings..... (a)		6.56	7.42	8.89
Other purposes.....	8.18	10.43	11.71	10.28
Total.....	100.0	100.0	100.00	100.00

Production of materials, in whose manufacture zinc dust is used, has increased considerably, including dyestuff intermediates and hydrosulfite, which itself is used as a reducing agent in the textile industry. Organic rubber chemicals, like phenylhydrazine are increasing in popularity and they, too, require zinc dust. Further developments, both in making special dusts for organic use and in expanding consumption of zinc in this field may be expected (1) F. G. Breyer, A.I.M.E.

Table 96.—Production of Zinc from Canadian Ores, by Provinces, 1925-1934

(For years 1898 to 1924, see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		Manitoba		British Columbia		Canada	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$		\$		\$
1925.....	9,936,000	757,322	179,545	13,685			99,152,966	7,557,439	109,268,511	8,328,446
1926.....	12,904,176	956,199					137,033,929	10,154,214	149,938,105	11,110,413
1927.....	17,189,046	1,064,690					148,306,479	9,186,103	165,495,525	10,250,793
1928.....	21,057,760	1,156,745	58,724	3,226			163,530,890	8,983,079	184,647,374	10,143,050
1929.....	19,653,440	1,058,731	5,516,806	297,190			172,096,841	9,270,857	197,267,087	10,626,778
1930.....	9,754,160	351,150	3,527,894	127,004	3,882,141	139,757	250,479,310	9,017,255	267,643,505	9,635,166
1931.....					35,173,749	898,338	202,071,702	5,160,911	237,245,451	6,059,249
1932.....					41,736,600	1,004,016	130,546,958	3,140,438	172,283,558	4,144,454
1933*.....					43,516,037	1,397,082	152,826,264	4,906,487	199,131,984	6,393,132
1934.....					47,264,342	1,438,538	249,152,403	7,583,202	298,579,683	9,087,571

*Included in the Canada total is a production of 2,789,683 pounds valued at \$89,563, representing zinc mined during 1933 in that part of the Flin Flon mine located in Saskatchewan; in 1934, the total for Canada includes 2,162,938 pounds valued at \$65,831 credited to Saskatchewan.

(a) Included in "other purposes."

Table 97.—Refined Primary Zinc Production in Canada, 1925-1934

Year	Short tons	Year	Short tons
1925.....	38,462	1930.....	121,496
1926.....	61,727	1931.....	118,622
1927.....	73,208	1932.....	86,141
1928.....	81,765	1933.....	91,946
1929.....	86,048	1934.....	134,917

NOTE.—For years 1916 to 1924, see previous reports.

Table 98.—Available Statistics on the Consumption of Zinc Metal in Specified Canadian Manufacturing Industries, 1933 and 1934

Industry	Items used	1933	1934
		Pounds	Pounds
Brass and copper products.....	Zinc castings..... Zinc ingots and bars..... Zinc plates, slabs and sheets.....	3,807,210	3,920,176
White metal alloys.....	Zinc scrap..... Zinc spelter.....	20,506 389,491	22,904 1,100,791
Electrical apparatus.....	Zinc scrap..... Zinc ingots and bars.....	396,837 293,851	283,278 448,343
Paints and pigments.....	Zinc sheets.....	1,491,941	1,587,233
Iron and steel.....	Zinc and zinc ore..... Zinc.....	1,003,896 16,400,446	1,762,565 19,017,095
Grand Total.....		23,804,178	28,142,385

Table 99.—Imports into Canada and Exports of Zinc, 1933 and 1934

	1933		1934	
	Pounds	Value	Pounds	Value
IMPORTS				
Zinc dust.....	841,400	\$ 47,826	1,067,300	\$ 61,135
Zinc in blocks, pigs, bars and rods, and zinc plates, n.o.p.....	16,400	1,074	18,300	1,282
Zinc in sheets and strips, and zinc plates for marine boilers.....	3,969,100	273,439	3,964,900	260,449
Zinc spelter.....	162,300	4,921	3,100	200
Zinc white (zinc oxide).....	9,804,697	428,201	11,754,090	520,911
Zinc sulphate.....	432,604	7,902	1,844,821	27,091
Zinc, chloride of.....	1,018,954	30,971	1,462,592	41,712
Zinc, manufactures of, n.o.p.....		72,499		82,883
Lithophone.....	11,387,409	406,598	14,530,612	510,558
Total.....		1,273,431		1,506,221
EXPORTS				
Zinc, contained in ore—				
To Belgium.....	6,071,600	121,241	9,388,800	175,550
Japan.....	2,254,000	14,008	8,947,500	140,657
United Kingdom.....			4,980,100	86,000
France.....			12,129,600	196,052
Germany.....			3,591,300	56,300
United States.....			6,100	276
Total.....	8,325,600	135,249	39,043,400	654,835
Zinc, scrap, dross and ashes—				
To United Kingdom.....	826,800	12,549	942,600	16,511
United States.....	511,900	2,933	18,000	529
Japan.....	2,911,900	18,220	2,970,200	28,484
Other countries.....	2,051,500	13,358	359,800	3,015
Total.....	6,302,100	47,060	4,290,600	48,539
Zinc, spelter—				
To United Kingdom.....	117,820,500	3,414,465	181,075,000	5,251,861
United States.....	56,000	2,156	127,000	2,928
British India.....	4,161,200	101,616	4,167,100	117,383
Argentina.....	2,354,800	68,294	1,108,100	37,604
Belgium.....	12,209,500	352,354	11,119,900	339,655
Brazil.....	347,400	8,548	459,500	14,639
China.....	2,940,400	90,002	2,089,100	68,250
France.....	1,691,800	49,739	1,669,700	42,709
Germany.....	2,866,300	77,726	851,700	26,443
Italy.....	1,120,400	26,665	2,240,900	64,202
Japan.....	25,761,500	740,398	30,842,300	958,823
Netherlands.....	1,691,900	47,101	1,792,600	56,062
Other countries.....	431,700	11,641	351,500	10,080
Total.....	173,453,400	4,990,705	237,894,400	6,990,639
Grand Total—Exports.....		5,173,014		7,691,013

Table 100.—Monthly Average Prices of Zinc at Montreal, St. Louis and London, 1932-1934

Month	Montreal ¹ (In cents per pound)			St. Louis ² (In cents per pound)			London ² (In pounds Sterling per long ton)		
	1932	1933	1934	1932	1933	1934	1932	1933	1934
January.....	4.063	3.924	4.750	3.011	3.018	4.271	14.416	14.381	14.688
February.....	3.936	3.983	4.658	2.817	2.666	4.384	13.872	13.866	14.844
March.....	3.820	4.152	4.498	2.787	2.987	4.368	12.616	14.647	14.735
April.....	3.634	4.139	4.367	2.725	3.298	4.370	11.670	14.951	14.916
May.....	3.564	4.294	4.174	2.532	3.805	4.346	12.432	15.505	14.722
June.....	3.480	4.637	4.010	2.777	4.348	4.240	11.548	16.988	14.241
July.....	3.355	5.095	3.850	2.537	4.878	4.317	11.592	17.795	13.466
August.....	3.561	4.809	3.824	2.758	4.916	4.281	13.594	16.869	13.682
September.....	3.802	4.802	3.700	3.322	4.699	4.049	15.455	16.810	12.644
October.....	3.667	4.657	3.580	3.027	4.748	3.832	14.869	16.310	12.217
November.....	3.834	4.643	3.627	3.094	4.520	3.732	15.264	15.048	12.000
December.....	3.971	4.720	3.665	3.124	4.461	3.711	15.209	14.826	11.730
Average.....	3.724	4.488	4.059	2.876	4.029	4.158	13.545	15.666	13.657

¹ Supplied by Consolidated Mining and Smelting Co., Montreal, Que.² From the Engineering and Mining Journal.

The London zinc price, on the basis of which the greater part of the Canadian production is sold, when converted to Canadian funds, averaged 2.4056 cents per pound in 1932; the corresponding figure for 1933 was 3.21 cents and for 1934, 3.0436 cents.

Table 101.—World Metal Production of Zinc, 1932-1934

(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom (b).....	26,875	45,000	54,000	Netherlands.....	15,377	18,186	19,597
Northern Rhodesia.....		18,542	19,540	Norway.....	38,751	44,238	44,316
Canada.....	76,912	82,095	120,462	Poland.....	83,611	81,399	91,453
Australia.....	53,200	53,956	54,629	U.S.S.R. (Russia).....	14,600	16,357	26,660
Total.....	157,000	200,000	249,000	Spain.....	9,355	8,413	8,052
FOREIGN COUNTRIES				Sweden.....	140		
Belgium.....	94,809	135,132	172,138	Mexico.....	29,800	26,400	28,568
Czechoslovakia.....	5,936	6,501	7,513	United States (c).....	184,954	274,270	324,634
France.....	44,975	51,100	46,502	French Indo-China.....	2,244	3,198	4,174
Germany (b) (d).....	44,182	50,000	70,072	Japan.....	26,616	30,173	31,638
Italy.....	17,700	22,915	24,471	Total.....	610,000	770,000	910,000
Yugoslavia (e).....	2,516	2,984	4,299	World's Total.....	770,000	970,000	1,160,000
Peru.....			5,463				

(b) Includes some secondary metal.

(c) The production by grades (including redistilled secondary) was as follows (long tons):—

	1932	1933	1934
A.—High grade.....	39,460	93,663	104,214
B.—Intermediate grade.....	11,871	24,166	29,126
C. and D.—Select and brass special.....	59,682	62,485	38,979
E.—Prime Western.....	87,082	120,820	169,896

Total secondary zinc recovered..... 63,500 49,700 33,500

(d) The figures published by Metallgesellschaft (which exclude secondary) are (long tons):—

(e) Including zinc dust 41,300 50,100 71,700

Table 102.—World Production of Zinc Ore (In terms of Metal) 1932-1934

(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom.....	4	4	445	Poland.....	25,000	35,000	40,000
Northern Rhodesia.....		18,542	19,540	U.S.S.R. (Russia).....	14,600	16,357	26,660
Canada (shipments) (b).....	126,486	120,339	141,396	Spain.....	34,000	35,000	31,000
Newfoundland.....	65,405	73,730	86,758	Sweden.....	24,156	24,346	28,664
India.....	41,400	55,400	54,800	Algeria.....	1,831	2,252	2,544
Australia.....	115,672	123,703	136,760	French Morocco.....		50	
Total.....	349,000	392,000	440,000	Mexico.....	56,308	87,928	123,209
FOREIGN COUNTRIES				United States.....	254,671	343,107	391,519
Austria.....	1,585	2,070	2,541	Bolivia (exports).....	12,763	13,200	9,338
Belgium (c).....	3,000	3,000	3,000	Peru.....	209	201	5,463
Bulgaria (estimated).....		150	150	China.....	4,427	3,989	4,000
Czechoslovakia.....	1,592	1,337	1,965	French Indo-China.....	4,918	4,910	4,881
Finland.....	861	1,067	1,000	Japan (c).....	12,000	15,000	20,000
France.....	1,193			Turkey.....	1,600	4,100	5,577
Germany.....	74,086	102,715	129,650	Roumania.....	105	4,129	3,667
Greece.....	6,809	12,160	(a)	Korea (ore).....		3,142	2,883
Italy.....	31,674	28,678	42,000	Portugal.....			18
Yugoslavia.....	47,207	58,326	52,967	Total.....	620,000	810,000	950,000
Norway.....	8,734	9,597	5,551	World's Total.....	970,000	1,200,000	1,390,000

(a) Information not available.

(b) The amount estimated as recoverable was:—

1932..... 76,912 long tons.

1933..... 88,898 “ “

1934..... 133,295 “ “

(c) Metallgesellschaft estimate.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. General Review.
2. Commodity statistics, including tables showing production by provinces, imports, exports, prices and world output of nickel, copper and metals of the platinum group.

1. General Review

(a) **Definition of the Industry.**—The nickel-copper industry in Canada includes the mining, smelting and to a certain extent the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., Kristiansand, Norway, and Clydach, Wales.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 13 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production and trade statistics on nickel, copper and the metals of the platinum group are given in this chapter.

(b) **Historical.**—Construction of railways in Canada has resulted in the discovery of some valuable mineral deposits. One of these was the finding of the nickel-copper ores of the Sudbury area during the building of the Canadian Pacific Railroad in 1883. The first of these ore bodies was mined for copper in 1886 and it was not until 1887 that the presence of nickel was detected. Almost coincident with these discoveries occurred the introduction of nickel in the manufacture of special steels. This stimulated an almost continuous growth in the industry, a growth which has firmly established Canada as the premier nickel producing nation of the world.

For many years the principal use for nickel was in the manufacture of war material, especially in armour plate; this particular consumption of the metal reached its maximum during the late World War. Following the cessation of hostilities the demand for nickel was greatly reduced and it was largely by intensive research that new uses for the metal were developed and production re-established on a firmer and broader basis. The almost universal industrial expansion during the years immediately preceding 1930 was largely responsible for the high production of 110,275,912 pounds of nickel from Canadian mines in 1929. Production of the metal later declined, sharply reflecting the general and severe economic depression of 1930, 1931 and 1932. In 1933 and 1934 there was a pronounced increase in Canadian nickel output, an increase which reflected the almost general improvement in both domestic and world industrial conditions.

(c) **Importance of Nickel, Copper and Platinum Group Metals.**—Canada supplies about 90 per cent of the world's nickel requirements, the remainder being obtained largely from New Caledonia. A small amount of nickel is recovered from the silver-cobalt ores of the Cobalt district, most of the Canadian nickel output is, however, produced from the ores of the Sudbury area.

The Canadian production of nickel in 1934 totalled 128,687,340 pounds, valued at \$32,139,452 as compared with an output of 83,234,653 pounds worth \$20,130,480 in 1933. The 1934 production of the metal comprised nickel in matte exported, electrolytic metal made at Port Colborne, Ontario, and nickel in oxides and salts produced in Canadian plants; the 1934 production of the metal was the greatest on record, surpassing 1929 the previous high year by 17 per cent. Of the total value of all metals produced in the Dominion, throughout 1934, the value of nickel comprised approximately 16.58 per cent, being surpassed only by that of gold.

Copper production in 1934 from the nickel-copper ores in Ontario constituted about 56.2 per cent of the total copper obtained from all Canadian ores. British Columbia, mining and smelting copper and copper-gold ores, produced approximately 13.2 per cent of Canada's copper output. Quebec supplied 20.3 per cent; the Manitoba production accounted for 8.5 per cent, and Saskatchewan 1.8 per cent.

As a world producer of copper in 1934 Canada ranks third; Chile was the leading copper producing country; followed, according to importance, by United States, Canada, Northern Rhodesia, Belgian Congo and Japan. Until within the last three years the amount of refined copper produced in Canada had been relatively small; previously it was found more profitable to ship blister copper or copper in matte or in concentrates to foreign metallurgical plants for conversion to refined metal.

During recent years Canada's new copper refineries located at Copper Cliff, Ontario, and Montreal East, Quebec, have maintained production of electrolytic copper at a most satisfactory rate and the high standard of this Canadian product is receiving ever growing recognition in the copper markets of the world.

Gold, silver, selenium and tellurium together with metals of the platinum group, including, in addition to platinum, the associated metals, palladium, rhodium, osmium and iridium, are present in varying amounts in the ores of the Sudbury district. The amounts of these metals in the different Sudbury nickel deposits vary considerably and their recovery has been a factor of growing importance in the metallurgical treatment of the nickel ores.

At the present time Canada produces a very considerable proportion of the world's supply of platinum and palladium; the refining of these metals is carried out in plants operating outside the confines of the Dominion.

(d) **Mining, Smelting and Refining.**—Practically all of the nickel produced in Canada is derived from the copper-nickel bearing deposits of the Sudbury district, Ontario. Two companies operate mines and metallurgical plants in this area. The International Nickel Company of Canada, Ltd., conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treat their matte in a refinery at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Company is treated in plants located at Clydach, Wales; Huntington, West Virginia; at Port Colborne and Copper Cliff, Ontario.

Throughout 1934 ore was mined continuously by the International Nickel Company of Canada, Ltd., from the Frood and Creighton Mines, the total tonnage shipped amounting to 2,690,814 tons, of which the Frood Mine contributed 1,868,186 tons and the Creighton Mine 822,628 tons. At the Frood Mine exploration work was restricted to the lower levels and ordinary development work was regulated to conform with ore requirements. In order to mine efficiently the larger reserves of proven ore in the lower levels, a new shaft is being sunk at the Creighton Mine; it is estimated that this project will be completed early in 1937.

The concentrator of the Company was operated at a uniform rate throughout the year and treated 1,843,146 tons of ore, the greatest tonnage thus far handled; the available capacity in the grinding and flotation sections is 3,000 tons per day. This capacity can be readily increased to 11,000 tons per day should demand call for increased quantities of nickel. The Copper Cliff Smelter produced 92,174 tons of bessemer matte and 97,611 tons of blister copper. Three reverberatory furnaces were in operation throughout the year. For the Orford separation process one blast furnace was used throughout the year and a second for seven months. At the Coniston Smelter three blast furnaces were in operation up to April 1st and four thereafter; during the year 840,980 tons of ore were smelted and 59,732 tons of bessemer matte produced.

At the Port Colborne refinery, six electrolytic circuits were in continuous operation during 1934 and a seventh was in use from April to August inclusive. The total output of nickel, inclusive of nickel in oxide was 70,974,850 pounds. At Clydach, Wales (the Mond Nickel Co., Ltd.) the output of nickel in various forms was 25,568,644 pounds compared with 20,760,117 pounds for 1933; the construction here of a small high-pressure carbonyl plant was started, this was expected

to be in operation early in 1935. Because of increased nickel production at Port Colborne and Clydach, the Acton (London, England) plant, (Mond) refined more platinum metals than during any previous year. Henry Wiggin's Co., Ltd., (subsidiary of the Mond Nickel Co.), reported that the various departments of its plant in England enjoyed an increased volume of business, and by December this works was operating at an average of eighty per cent of present capacity. In the United States the Huntington Works of the International Nickel Co. Inc., was operated throughout the year at approximately 33 per cent of capacity, a rate considerably in excess of the previous year, while at the Bayonne (N.J.) plant total shipments were 41 per cent in excess of 1933, particularly noticeable were shipments of threaded fittings, coated welding wire, and casting block, each of which increased.

The total number of employees of the International Nickel and associated companies at the year-end was 9,154 distributed as follows: Canada 5,474; Great Britain 2,507; United States 1,122; other countries, 51. Employees on December 31, 1933, numbered 8,297. The increase amounting to ten per cent, is due to the increased scale of operations. Capital expenditure scheduled for 1935, covering all properties calls for an estimated total of \$2,500,000. During 1934 the Mond Nickel Co., Ltd., entered into an agreement with the Government of Finland by which that Company has secured the sole rights, subject to the conditions contained in the agreement, to prospect for, mine, and treat nickel-bearing ore which may occur in a defined territory in Finland.

Sales by the Company of nickel in all forms, including nickel in alloys amounted to 91,459,554 pounds compared with 74,356,969 pounds in 1933, an increase of 23 per cent. Sales of nickel in products of the Port Colborne (Canada) and Clydach (Wales) refineries amounted to 73,964,621 pounds compared with 61,353,495 pounds in 1933, an increase of 21 per cent. Sales of nickel in products of the Copper Cliff Smelter amounted to 1,357,008 pounds. Sales of nickel in products of the rolling mills at Birmingham, (England) Glasgow, (Scotland) and Huntington, (West Virginia), and of the foundry at Bayonne, (New Jersey) totalled 16,137,925 pounds compared with 13,003,474 pounds, an increase of 24 per cent.

Copper sales, inclusive of copper in sulphate produced in Wales, increased from 113,682,312 pounds to 194,870,682 pounds or 71 per cent. Gold sales were 74,375 ounces compared with 21,355 ounces in 1933; silver sales were 1,006,808 ounces compared with 876,303 ounces and sales of the platinum metals were 124,424 ounces compared with 77,198. Sales of selenium were 73,516 pounds and sales of tellurium 1,110 pounds.

Proven ore reserves of the International Nickel Company on December 31st, 1934, were 204,399,463 tons. In the ordinary course of mining operations 2,720,779 tons were added to reserves.

Stoping of ore by Falconbridge Nickel Mines Ltd., during 1934 not only broke enough to satisfy the treatment plant requirements, but added 100,962 tons to the broken ore reserve, which stood at 509,742 tons at the end of the year. The tendency in stoping is to break wider than originally calculated, with the consequent increase in tonnage and lowering of grade. Justification for this is found in the fact that the cost of producing nickel in matte has progressively lowered in spite of lowered grade in ore according to the consulting engineer of the Company. By the end of the year the eastern orebody had been developed on the 500 ft. horizon over a length of 1,000 feet with ore still in the eastern face, on the 750 foot level, an advance of 610 feet west disclosed 575 feet of good ore. Preparations for sinking a five compartment shaft at a location some 2,400 feet east from the present working shaft were made, this shaft is thirteen feet four inches by nineteen feet six inches, outside timber, and will be continued to a depth of 1,500 feet; sinking through 100 feet of overburden was commenced in June and bed rock entered in September. Data relating to the treatment plant are as follows:—

	1934		1933	
	Nickel	Copper	Nickel	Copper
	Per cent	Per cent	Per cent	Per cent
Grade of ore treated.....	2.050	.995	2.163	.986
Recovered in matte.....	1.906	.898	2.006	.904
Metallurgical losses.....	.144	.097	.157	.082

From 317,646 tons of ore delivered to the crushing plant 44,116 tons or 13.9 per cent of waste was eliminated by sorting and discarded. The balance, 273,530 tons was transported over the aerial tramway to the treatment plant. The consequent production of matte for shipment to the refinery in Norway totalled 9,271.4 tons containing 10,405,200 pounds of nickel and 4,901,600 pounds of copper plus some precious metals. Refined metals produced in Norway during the period under review totalled 11,692,746 pounds of nickel and 6,241,125 pounds of copper. Of these 9,508,939 pounds nickel and 4,633,235 pounds copper were for account of Falconbridge, the balance being refined for a toll customer. In addition precious metals were recovered which sold for \$82,000; all for Falconbridge account. The plant for separation of precious metals was finished and the refinery operated very steadily throughout the year.

The copper-nickel property of Cuniptau Mines Ltd., located in Strathroy Twp., Northern Ontario, was active throughout 1934, both surface and underground operations were conducted and considerable diamond drilling completed; this Company erected a 60 ton smelter for the production of copper-nickel matte.

During 1934 approximately 130 men were employed by British Columbia Nickel Mines Ltd., the property of this Company is situated 15 miles by road northwest at Hope, British Columbia. Several hundred acres of the company's claims were surveyed with a magnetometer of the Askania type and it is stated that this work indicated some sixty-eight areas of possible nickeliferous-pyrrhotite mineralization. On several of these indicated areas test-pits were sunk to bed-rock and in every case nickeliferous mineralization was reported found, where indicated. About 2,000 feet of diamond drilling was also completed in 1934, most of it being done from underground stations in the No. 1 tunnel which tunnel at an elevation of 3,527 feet was holed through in a length of 4,700 feet to the Emory Creek side of the mountain. No. 2 adit, the portal of which is approximately 2,200 feet west of No. 1 tunnel and at an elevation of 3,275 feet above sea-level, was advanced to a total distance of 2,208 feet from the portal at the end of 1934.

An average of 1.02 per cent nickel and 0.45 per cent copper was obtained from 50 feet of core length, with 20 feet of core length averaging 1.67 per cent nickel. This core came from horizontal hole No. 79 located 1,706 feet from the portal of No. 2 adit.

Nickel production as an economic factor of growing importance in Canada is reflected in an amount of \$16,170,000, expended by this industry for consumable stores, equipment, freight and insurance during 1934.

Table 103.—Principal Statistics of the Complete Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1932-1934

	1932	1933	1934
Number of firms.....	3	4	4
Number of mines.....	6	7	7
Number of smelters.....	3	3	4
Number of refineries.....	1	1	1
Capital employed..... \$	78,188,204	84,836,327	88,574,427
Number of employees—On salary.....	188	191	223
On wages.....	2,218	3,407	5,394
Total.....	2,406	3,598	5,617
Salaries and wages—Salaries..... \$	611,496	617,599	740,191
Wages..... \$	3,309,099	4,971,011	8,124,581
Total..... \$	3,920,595	5,588,610	8,864,772
Fuel and electricity used..... \$	1,371,985	2,582,216	4,202,810
Estimated value of matte exported and refinery products produced..... \$	14,003,637	25,052,622	52,906,920

Table 104.—Output from Canadian Nickel-Copper Mines and Metallurgical Plants, 1932-1934

	1932	1933	1934
	Tons	Tons	Tons
Ore and concentrates treated.....	793,552	1,523,814	2,896,359
Refined nickel (x) produced in Ontario.....	7,063	20,748	35,487
Blister copper produced in Ontario.....	30,020	61,385	97,611
Matte exported.....	21,778	43,315	46,755
Nickel content of matte.....	8,068	20,811	28,771
Copper content of matte.....	8,825	12,323	6,692

(x) Includes nickel in salts and oxides.

Table 105.—Proportion of Nickel and Copper in Sudbury Matte, 1925-1934

Year	Percentage			Year	Percentage		
	Nickel	Copper	Total		Nickel	Copper	Total
1925.....	52.1	27.9	80.0	1930.....	36.6	42.5	79.1
1926.....	49.6	30.6	80.2	1931.....	40.5	38.7	79.2
1927.....	48.4	31.7	80.1	1932.....	40.7	38.4	79.1
1928.....	47.6	32.6	80.2	1933.....	44.7	31.6	76.3
1929.....	44.0	35.1	79.1	1934.....	44.4	32.9	77.3

NOTE.—For years 1912 to 1934 see previous reports.

Table 106.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1933 and 1934

	1933				1934			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees—								
Mine and mill.....	56	3	59	166,531	52	1	53	167,030
Smelters and refinery.....	119	13	132	451,068	134	36	170	573,161
Total.....	175	16	191	617,599	186	37	223	740,191
Wage-earners—								
Mine and mill.....	1,540		1,540	2,351,650	2,624		2,624	4,208,672
Smelters and refinery.....	1,867		1,867	2,619,361	2,770		2,770	3,915,909
Total.....	3,407		3,407	4,971,011	5,394		5,394	8,124,581
Grand total.....	3,582	16	3,598	5,588,610	5,580	37	5,617	8,864,772

Table 107.—Wage-Earners Employed by Months, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1931 to 1934

	1931	1932	1933	1934
January.....	4,726	3,014	1,822	4,811
February.....	4,656	3,019	1,957	4,876
March.....	4,641	3,039	2,036	5,048
April.....	4,620	2,577	1,976	5,189
May.....	4,597	2,379	2,034	5,409
June.....	4,422	2,434	3,001	5,622
July.....	4,324	2,235	3,957	5,658
August.....	4,262	1,672	4,523	5,566
September.....	3,657	1,628	4,775	5,500
October.....	3,068	1,580	5,050	5,722
November.....	3,195	1,490	4,968	5,707
December.....	3,094	1,551	4,762	5,609

NICKEL

Production figures include nickel in matte or speiss exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts sold, valued in the aggregate at the sum obtained from the sales of oxides or salts.

Table 108.—Production of Nickel from Canadian Ores, 1923-1934

(For years 1889 to 1922 see report on the Mineral Production of Canada, 1928)

Year	Pounds of nickel	Value	Year	Pounds of nickel	Value
		\$			\$
1923.....	62,453,843	18,332,077	1929.....	110,275,912	27,115,461
1924.....	69,536,350	19,470,178	1930.....	103,768,857	24,455,133
1925.....	73,857,114	15,946,672	1931.....	65,666,320	15,267,453
1926.....	65,714,294	14,374,163	1932.....	30,327,968	7,179,862
1927.....	66,798,717	15,262,171	1933.....	83,264,658	20,130,480
1928.....	96,755,578	22,318,907	1934.....	128,687,340	32,139,425

Table 109.—Production in Canada, Imports and Exports of Nickel, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$	Pounds	\$
PRODUCTION—						
Nickel in matte and speiss exported, refined and electrolytic nickel produced, and nickel in oxides and salts sold.....	30,327,968	7,179,862	83,264,658	20,130,480	128,687,340	32,139,425
IMPORTS—						
Nickel, nickel silver and German silver, in ingots or blocks, n.o.p.....	7,364	2,179	686,777	193,229	2,646	771
†Nickel in bars and rods, strips, sheets and plates.....	452,781	172,446	203,217	95,189	591,466	197,230
Nickel silver and German silver, in bars, rods, strips, sheets, plates or anodes....	37,218	12,585	51,742	17,012	48,359	14,187
Nickel chromium, in bars and rods.....	41,434	46,443	50,841	46,210	48,413	45,114
German, Nevada and nickel silver, manufactures of, not plated.....		160,798		127,076		140,682
Nickel-plated household hollow-ware.....		12,915		1,900		9,075
Nickel kitchenware.....		825		1,365		872
Nickel-plated ware, n.o.p.....		845,734		509,862		753,421
Total nickel and its products.....		1,253,925		1,051,843		1,161,352
EXPORTS—						
Nickel, fine.....	15,165,500	4,022,748	42,092,200	13,173,273	54,723,800	16,357,933
Nickel contained in matte.....	15,169,200	2,757,713	38,325,300	6,862,502	59,343,800	10,540,870
Nickel in oxide.....	1,737,200	503,503	7,664,600	2,760,193	5,084,500	2,014,427
Total.....	32,071,900	7,283,964	88,082,100	22,795,968	118,152,100	28,913,230

†Not including bars or rods depolarized or otherwise processed for use as anodes.

Table 110.—World Production of Nickel Ore, 1932-1934

(In terms of metal)
(Supplied by the Imperial Institute)
(Long tons)

Country	1932	1933	1934
British Empire—			
Canada.....	13,539	37,172	57,450
India (b).....	930	973	1,200
Australia.....	(11 cwt.)	9	
Total.....	14,500	38,200	58,700
Foreign Countries—			
U.S.S.R. (Russia).....			849
Brazil (ore).....		310	(a)
Greece.....	940	1,355	(a)
Norway.....	930	979	1,312
United States (d).....	174	113	(a)
New Caledonia (c).....	4,958	4,860	8,500
Total.....	7,000	7,300	12,100
World's total.....	21,500	45,500	70,800

(a) Information not available.

(b) Nickel content of speiss obtained as a by-product in smelting operations.

(c) Estimated content of matte and ferro-nickel obtained at smelters was as follows:—

1932..... 2,200 long tons

1933..... 4,000 "

(d) Nickel content of salts and nickel produced as a by-product in the electrolytic refining of copper (partly from imported blister copper).

Secondary metal was recovered in the United States as follows:—

1932..... 1,295 long tons

1933..... 1,473 "

1934..... 1,652 "

INDUSTRIAL NICKEL ALLOYS

(Supplied by International Nickel Co. of Canada, Ltd.)

Nickel is extensively used in combination with other metals in steels, irons and a large number of non-ferrous alloys, many of which are "key" materials of industry.

- Nickel steels ($\frac{1}{2}\%$ to 7% nickel)
- Nickel steel castings (1% to 4% nickel)
- Corrosion resistant steels (7% to 35% nickel)
- Heat resistant steels (7% to 35% nickel)
- Heat resistant alloys (35% to 85% nickel)
- Electric resistance alloys (up to 85% nickel)
- Iron nickel alloys—
 - Non-magnetic (10% to 25% nickel)
 - Low expansion (32% to 45% nickel)
 - Highly magnetic (45% to 80% nickel)
- Nickel cast irons—
 - High quality cast iron ($\frac{1}{2}\%$ to 5% nickel)
 - High strength cast iron (1% to 2 $\frac{1}{2}\%$ nickel)
 - Chilled cast iron (4% to 6% nickel)
 - Corrosion resistant cast irons (14% to 30% nickel)
- Nickel wrought iron (3% nickel)
- Nickel-silvers (5% to 30% nickel, plus copper and zinc)
- Nickel bronzes ($\frac{1}{2}\%$ to 8% nickel)
- Copper-nickel alloys (15% to 50% nickel)

The International Nickel Co. of Canada, Ltd., states that the year 1934 witnessed a further increase in world nickel consumption, the deliveries in all forms being about 122,000,000 pounds compared with 96,000,000 pounds in 1933. As heretofore, the use of nickel was well distributed among different nickel-consuming countries as well as within various nickel-consuming industries. Although the increased pace of Nickel consumption everywhere was well maintained, those industrial centres whose economic recovery has been most rapid have naturally registered the most prominent gains. The demand for nickel in the United Kingdom reached an all time peak in 1934; nickel deliveries were about equally divided between America (the United States and Canada) and the rest of the world. The automobile industry continued to be the largest single consumer of nickel, using about thirty per cent of the total in the United States and Canada; paralleling the general increase in steel and in foundry iron production, the use of nickel cast iron and of nickel steel increased substantially, one of the outstanding developments in the field of nickel alloy steel was the adoption of welded nickel steel for the pressure vessels and equipment used in the de-waxing processes for oil refining. Pure nickel as well as nickel-clad steel continued to be favoured for the construction of equipment for the manufacture of caustic soda. Ethiopia issued ten million coins of pure nickel, becoming the twenty-eighth nation to use pure nickel coinage. The amount of nickel going into light aluminium alloys registered an increase and the use of the metal in stainless steel continued to advance.

"Die Metallbörse" reported in 1934 that Russia was about to greatly extend its nickel production. The Orsk Works in the Urals are to be increased to produce 500 tons yearly—at present the Russian production amounts to about 1.4 per cent of the world production, but the programme laid down contemplates a yearly production of 5,000 tons. The U.S.S.R. Chamber of Commerce, Moscow, announced in July 1935, that a large nickel plant will commence production in the Orks region in 1937.

COPPER

CANADA

Copper production includes copper contained in ores and concentrates exported, copper contained in blister copper made, and copper in matte exported.

Production of new copper in Canada during 1934 totalled 364,761,062 pounds valued at \$26,671,438 as compared with 299,982,448 pounds at \$21,634,853 in 1933. The quantity produced in 1934 constitutes an all time high record for the industry, the previous high output being 303,478,356 pounds recorded for 1930. The decrease in the average price of the metal from

12·982 cents per pound on the New York market in 1930 to 7·419 cents in 1934, as computed from London quotations, is strongly reflected in the value of the 1934 copper output as compared with that of 1930.

The United Kingdom is now Canada's principal market for copper and it is encouraging to note a distinct improvement in 1935 in the price of copper in London where the price per pound, expressed in Canadian funds, increased from an average of 6·820 cents in January to 8·802 cents for the month of October. The pronounced change in the international flow of Canadian copper is emphasized in the fact that 95·7 per cent of the total value of Canadian copper exports in 1930 went to the United States and only 1·9 per cent to the United Kingdom, whereas in 1934 the percentage to the United States had fallen to 13·1 while the value of consignments to the United Kingdom had increased to 64·2 per cent.

In 1934 copper was produced in Quebec, Ontario, Manitoba, Saskatchewan and British Columbia; the first two provinces were the Dominion's greatest producers contributing 20·3 per cent and 56·2 per cent respectively of the total output of 364,761,062 pounds. The recorded output for the year included 334,703,227 pounds contained in blister and anode copper, 16,674,356 pounds in ores, concentrates and copper matte exported, and 13,383,479 pounds in exports of nickel-copper matte.

The uptrend in Canadian copper output experienced in 1934 continued through into 1935 when an output of 312,520,346 pounds of copper produced during the first nine months compared with 266,302,345 pounds in the corresponding months of 1934 would indicate an all time high production record for the Canadian copper mining industry in 1935.

More complete particulars relating to the mining and smelting of Canadian copper-bearing ores are contained in chapters 2 and 6 of this report.

Table 111.—Production of Copper from Canadian Ores, 1925-1934

Year	Pounds	Value	Cents per pound	Year	Pounds	Value	Cents per pound
		\$				\$	
1925.....	111,450,518	15,649,882	14·042	1930.....	303,478,356	37,948,359	*
1926.....	133,094,942	17,490,300	*	1931.....	292,304,390	24,114,065	*
1927.....	140,147,440	17,195,487	*	1932.....	247,679,070	15,294,058	*
1928.....	202,696,046	28,598,249	*	1933.....	299,982,448	21,634,853	*
1929.....	248,120,760	43,415,251	*	1934.....	364,761,062	26,671,438	*

*Since 1926 the value of Canada's copper production was computed according to the note in Appendix.

NOTE.—For years 1886 to 1924 see previous reports.

Table 112.—Production of Primary Copper in Canada, by Provinces and by Sources, 1933 and 1934

	1933		1934	
	Pounds	\$	Pounds	\$
By PROVINCES—				
Quebec.....	69,943,882	5,214,177	73,968,545	5,487,948
Ontario.....	145,504,720	10,118,847	205,059,539	14,822,704
Manitoba.....	38,163,181	2,844,989	30,867,141	2,290,126
Saskatchewan.....	3,223,941	240,338	6,618,913	491,077
British Columbia.....	43,146,724	3,216,502	48,246,924	3,579,583
Total.....	299,982,448	21,634,853	364,761,062	26,671,438
By SOURCES—				
In blister and anode copper produced.....	260,386,164	19,411,268	334,703,227	24,832,061
In ores, concentrates and copper matte exported.....	14,950,300	1,114,515	16,674,356	1,237,120
In nickel-copper matter exported.....	24,645,984	1,109,070	13,383,479	602,257
Total.....	299,982,448	21,634,853	364,761,062	26,671,438

DOMINION BUREAU OF STATISTICS

Table 113.—Production of Refined Copper in Canada, 1925-1934

Year	Tons	Year	Tons
1925.....	170	1930.....	31,377
1926.....	10,581	1931.....	92,183
1927.....	9,191	1932.....	90,077
1928.....	8,806	1933.....	112,245
1929.....	3,518	1934.....	149,261

NOTE.—For years 1916 to 1924 see previous reports.

Table 114.—Production of Copper Sulphate in Canada, 1925-1934

Year	Pounds	Year	Pounds
1925.....	121,746	1930.....	734,300
1926.....	404,862	1931.....	62,140
1927.....	566,825	1932.....	*900,220
1928.....	771,400	1933.....	*629,100
1929.....	617,430	1934.....	*733,720

*Used by producer.

Table 115.—Quantity and Value of Copper Produced in Canada, by Provinces, 1925-1934

(For production in previous years see Mineral Production of Canada, 1928)

Year	Quebec		Ontario	
	lb.	\$	lb.	\$
1925.....	2,510,141	352,474	39,718,777	5,577,311
1926.....	2,674,058	368,886	41,312,867	4,828,964
1927.....	3,119,848	403,084	45,341,295	4,946,533
1928.....	33,697,949	4,909,791	66,607,510	8,770,149
1929.....	55,337,169	10,019,901	88,879,853	14,622,572
1930.....	80,310,363	10,425,891	127,718,871	15,187,259
1931.....	68,376,985	5,723,154	112,882,625	9,096,463
1932.....	67,336,692	4,296,216	77,055,413	4,407,928
1933.....	69,943,882	5,214,177	145,504,720	10,118,847
1934.....	73,968,545	5,487,948	205,059,539	14,822,704

Year	Manitoba		Saskatchewan†	
	lb.	\$	lb.	\$
1925.....	.....	.....	.....	.....
1926.....	.....	.....	.....	.....
1927.....	.....	.....	.....	.....
1928.....	.....	.....	.....	.....
1929.....	.....	.....	.....	.....
1930.....	2,087,609	215,018	.....	.....
1931.....	45,821,432	3,835,254	.....	.....
1932.....	52,706,861	3,362,803	.....	.....
1933.....	38,163,181	2,844,989	3,223,941	240,338
1934.....	30,867,141	2,290,126	6,618,913	491,077

Year	British Columbia		Yukon	
	lb.	\$	lb.	\$
1925.....	69,221,600	9,720,097	.....	.....
1926.....	89,108,017	12,292,450	.....	.....
1927.....	91,686,297	11,845,870	.....	.....
1928.....	102,283,210	14,902,664	.....	.....
1929.....	103,903,738	18,772,778	*107,377	15,645
1930.....	93,318,885	12,114,657	42,628	5,534
1931.....	65,223,348	5,459,194	.....	.....
1932.....	50,580,104	3,227,111	.....	.....
1933.....	43,146,724	3,216,502	.....	.....
1934.....	48,246,924	3,579,583	.....	.....

*Includes small quantities produced in 1925, 1926 and 1927, but not reported until 1928.

†The metal is recovered from that part of the Flin Flon mine situated on the Saskatchewan side of the Manitoba-Saskatchewan border.

Table 116.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1933 and 1934

Industries	Item (Used)	1933	1934
Brass and copper products (a).....	Ingots, billets, slabs, etc..... lb.	52,020,637	64,445,050
	Castings..... lb.	285,892	39,517
	Pipe and tubing..... lb.	51,426	172,488
	Bars and rods..... lb.	12,768,699	32,580,001
	Plates and sheets..... lb.	334,103	447,476
	Wire..... lb.	1,072,134	312,668
	Scrap..... lb.	1,382,467	4,318,264
	Other..... lb.	16,694	39,372
White metal alloys.....	(Scrap..... lb.	1,607,143	1,898,265
	Copper bars, sheets, etc..... lb.	42,821	38,764
Electrical apparatus and supplies.....	Pig and bars..... lb.	90,742	36,503
	Rods..... lb.	14,793,411	21,369,673
	Tubing and pipe..... lb.	120,108	294,685
	Sheets and plates..... lb.	136,413	193,502
	Wire, bare..... lb.	1,823,238	2,527,365
	Wire, other insulated..... \$	121,749	363,857
	Wire, enamelled..... \$	155,467	262,687
Iron and steel and their products.....		1932	1933
	Copper sheets, bars, etc..... lb.	3,321,788	3,230,569

(a) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable and duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 117.—Imports into Canada and Exports of Copper, 1933 and 1934

	1933		1934	
	Pounds	Value \$	Pounds	Value \$
IMPORTS—				
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires and electric cables for use only in the manufacture of such articles in their own factories.....	97,400	12,084	410,300	49,228
Copper bars for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors, and copper rods for such manufacture, individual units of conductors not to exceed area of No. 7-0 gauge conductor.....	4,000	300	64,800	5,624
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured, n.o.p.....	305,900	38,736	242,200	31,097
Copper in blocks, pigs or ingots.....	17,200	1,603	34,700	3,693
Copper, scrap, cathode plates.....	4,000	247	26,700	1,256
Copper in strips, sheets or plates not polished or coated.....	144,100	25,142	223,700	37,707
Copper tubing in lengths of not less than 6 feet, and not polished, bent, or otherwise manufactured.....	256,491	53,464	329,275	74,887
Copper wire.....	22,355	3,997	72,515	18,011
Copper wire cloth, or woven wire of copper.....		4,304		1,803
Copper, manufactures of, n.o.p.....		249,680		287,429
Copper, precipitate of, crude.....	20	4	704	113
Anodes of nickel, zinc, copper, silver or gold.....		2,649		1,067
Copper, sub-acetate of, or verdigris, dry.....	210	43	2,844	554
Copper, sulphate of (blue vitriol).....	2,389,595	78,448	5,277,499	170,303
Copper rollers and stones adapted for use in textile and paper printing.....		51,115		53,222
Copper, sulphate of, dehydrated, for agricultural or spraying purposes.....	2,195,858	68,887	42,050	3,295
Total.....		591,003		739,289
EXPORTS—				
Copper, fine, contained in ore, matte, regulus, etc.....	35,436,100	1,723,705	35,145,200	1,655,936
Copper blister.....	15,136,000	1,250,750	26,962,200	2,113,200
Copper, old and scrap.....	4,866,800	264,882	3,888,200	222,909
Copper in ingots, bars, cakes, slabs and billets.....	153,348,300	10,346,590	187,554,000	13,943,724
Copper in rods, strips, sheets, plates and tubing.....	38,700,600	3,061,014	57,903,100	4,801,979
Copper wire and cable.....		122,260		323,683
Copper manufactures, n.o.p.....		148,475		252,331
Total.....		16,917,946		23,313,762
Copper coin, foreign.....		22,866		1,932
Copper coin, Canadian.....		340		43

Table 118.—Copper Prices, by Months, 1933, 1934 and 1935

Month	Copper (Electrolytic)						
	New York			London			
	1933	1934	1935	1933	1934	1935	
	(cents per pound)			(£ sterling per long ton)			
January.....	4-775	7-890	8-775	33-244	35-614	31-261	(a) 6-820
February.....	4-775	7-777	8-775	32-556	35-969	30-244	6-593
March.....	5-011	7-775	8-775	32-370	35-512	31-607	6-808
April.....	5-395	8-173	8-775	33-681	36-038	34-763	7-546
May.....	6-698	8-275	8-775	38-163	35-756	36-733	8-028
June.....	7-773	8-594	8-634	41-000	35-339	34-039	7-511
July.....	8-635	8-775	7-775	41-524	32-778	34-261	7-598
August.....	8-768	8-775	7-979	40-227	31-483	35-976	8-006
September.....	8-753	8-775	8-504	38-339	30-556	37-952	8-421
October.....	7-950	8-775	8-967	36-977	29-478	39-609	8-802
November.....	7-881	8-775	9-025	33-898	30-222	39-396	8-754
December.....	7-885	8-775	9-025	34-329	31-086	39-313	8-732
Average.....	7-025	8-428	8-649	36-359	33-319	35-430	7-795

(a) Equivalent in cents per pound expressed in Canadian funds.

Transposed into Canadian funds the average price of copper based on the London market was 7-4548 cents per pound in 1933; 7-4193 cents in 1934 and 7-2177 cents for the first six months of 1935.

Table 119.—Canadian Copper Ore Reserves (†) as Officially Reported

(American Bureau of Metal Statistics)

—	Year	Province	Short tons ore	Average grade	Short tons copper
				%	
Falconbridge.....	1934	Ontario.....	2,960,238	0-90	26,600
Granby Consolidated (a).....	1933	British Columbia.....	13,449,900	1-81	243,400
Hudson Bay.....	1930	Manitoba.....	18,000,000	1-71	307,800
International Nickel.....	1934	Ontario.....	204,399,463	(x) 2-00	4,088,000
Noranda.....	1934	Quebec.....	28,305,000	2-51	709,500
Normetal.....	1933	Quebec.....	625,000	3-00	18,800
Sherritt Gordon.....	1932	Manitoba.....	4,799,175	2-41	115,900
Waite Amulet.....	1933	Quebec.....	1,067,350	6-00	64,000
Britannia.....		British Columbia.....			
Consolidated Copper and Sulphur.....		Quebec.....			
Aldermac Mines Ltd.....		Quebec.....			

(x) Approximate.

† Producing or developed for production.

(a) Anyox properties now closed.

Table 120.—Copper Available for Consumption in Countries Other Than United States and Canada, 1933, 1934 and 1935

(Compiled by the American Bureau of Metal Statistics)

Country	Average per month			Number of months reported in 1935
	1933	1934	1935	
Great Britain.....	12,092	18,425	20,123	9
France.....	9,025	7,558	8,378	7
Germany.....	14,158	18,450	17,759	8
Italy.....	4,992	5,242	6,971	8
Japan.....	6,875	9,375	11,544	7
Austria.....	592	808	1,057	8
Czechoslovakia.....	1,083	1,492	1,640	8
Hungary.....	475	717	774	6
Netherlands.....	358	442	310	9
Poland.....	592	900	966	8
Sweden.....	2,458	3,025	3,781	8
Switzerland.....	1,233	1,208	1,170	9
Other Europe.....	6,550	7,875	10,800	.....
India.....	445	600	765	7
Elsewhere.....	1,472	1,650	1,700	.....
Total—metric tons.....	62,400	77,767	87,738	.....
Total—short tons.....	68,784	85,723	96,714	.....

Table 121.—World Production of Copper Ore, 1932-1934

(In terms of metal)
(Supplied by Imperial Institute)
(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES —concluded			
United Kingdom.....	61	40	14	Portugal (estimated)	2,000	2,000	2,000
N. Rhodesia.....	87,239	129,423	157,599	Roumania.....	12	23	17
S. Rhodesia (smelter).....	6	.....	.....	U.S.S.R. (Russia).....	31,500	32,200	43,400
South West Africa (c).....	2,400	.....	.....	Spain.....	32,000	29,000	30,000
Union of South Africa.....	9,254	8,250	7,745	Sweden.....	4,241	6,762	4,982
Canada.....	110,571	133,921	162,840	Algeria.....	18	17	138
Cyprus (estimated).....	3,200	4,230	4,986	Belgian Congo	53,000	65,544	108,346
India (estimated).....	11,200	10,700	11,500	(smelter).....	.....	.....	.....
Australia.....	14,658	14,413	12,012	French Equatorial	.....	.....	.....
Newfoundland.....	2,091	3,167	4,229	Africa.....	150	1,500	(a)
Total.....	241,000	304,000	361,000	Cuba.....	5,833	8,815	6,094
FOREIGN COUNTRIES				Mexico (c).....	34,698	39,196	43,569
Austria.....	168	131	82	United States (c).....	212,599	170,217	211,563
Bulgaria (ore).....	40	.....	55	Bolivia (exports).....	1,985	1,819	1,596
Czechoslovakia.....	66	.....	160	Chile.....	101,600	160,000	260,000
Finland.....	5,262	5,582	8,666	Peru.....	24,691	30,773	27,297
France.....	428	222	325	Formosa.....	3,400	3,900	(a)
Germany.....	30,255	30,988	25,560	China (smelter).....	433	497	(a)
Hungary (smelter).....	274	310	224	Japan (smelter).....	70,741	67,942	65,944
Italy.....	375	324	320	Korea.....	800	900	1,500
Yugoslavia.....	17,900	33,500	42,300	Greece.....	.....	2	(a)
Norway.....	16,501	19,500	20,840	Total.....	650,000	710,000	920,000
				World's Total...	890,000	1,010,000	1,280,000

(a) Information not available.

(b) Years ended March 31, of the year following that stated.

(c) Amount estimated as recoverable.

Table 122.—World Metal Production of Copper, 1932-1934

(Supplied by Imperial Institute)
(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES —concluded			
United Kingdom.....	13,000	11,100	11,200	Norway.....	5,230	6,588	7,863
Northern Rhodesia.....	67,887	104,205	137,897	Roumania.....	108	446	(a)
Southern Rhodesia.....	6	.....	.....	U.S.S.R. (Russia)	45,900	44,600	52,800
Union of South Africa.....	9,239	8,236	8,196	(estimated).....	15,310	16,995	13,559
Canada (d).....	94,199	116,244	149,423	Spain.....	3,237	6,660	7,980
India.....	4,443	4,800	6,300	Sweden.....	53,000	65,544	108,346
Australia.....	13,307	11,238	7,970	Belgian Congo.....	43,047	39,300	42,410
Total.....	202,000	256,000	321,000	United States.....	274,591	223,634	247,257
FOREIGN COUNTRIES				Chile.....	95,976	154,021	252,655
Austria.....	1,956	995	587	Peru.....	20,568	24,775	27,589
Belgium.....	26,524	34,802	60,135	China.....	433	497	(a)
Czechoslovakia.....	921	767	623	Japan.....	70,741	67,942	65,944
France.....	303	(a)	(a)	Korea.....	683	772	1,412
Germany (b).....	50,100	49,000	52,200	Formosa.....	1,600	1,400	(a)
Italy.....	420	118	446	Total.....	740,000	780,000	990,000
Yugoslavia.....	29,683	39,721	43,689	World's Total...	940,000	1,040,000	1,310,000

(a) Information not available.

(b) Metallgesellschaft figures.

(d) Copper content of blister copper.

METALS OF THE PLATINUM GROUP

The output of platinum metals in Canada comes almost entirely from the copper-nickel ores of the Sudbury district in Ontario and the refining of these metals is accomplished in European metallurgical plants. Relatively small amounts of platinum are also recovered annually from stream gravels in British Columbia; 200,162 fine ounces of new platinum, palladium and other platinum group metals valued at \$6,190,045 were recovered from Canadian mineral deposits in 1934 as compared with 55,795 fine ounces worth \$1,502,633 in 1933; the 1934 figures represent an increase over the preceding year of 258.7 per cent in quantity and 312 per cent in value and constitute an all time high record for the production of these metals in Canada.

Imports of platinum, including manufactures thereof, and palladium, iridium, ruthenium and rhodium were valued at \$64,023 in 1934 as compared with a value of \$72,380 in 1933. Exports in 1934 of platinum contained in concentrates or other crude forms totalled 133,072 fine ounces valued at \$5,186,489 as compared with 29,228 fine ounces at \$1,168,565 in 1933. Exports of platinum, old and scrap, amounted to 410 fine ounces worth \$12,202 during 1934; the corresponding figures for 1933 were 189 ounces and \$5,439.

In British Columbia, International Placers Ltd., have been operating the old Swan and other leases between Granite Creek and the Tulameen river near Coalmont. On the Swan, between February and the end of May, 264 feet of drifts were driven, exposing 2,107 square feet of bed rock, from which 172 oz. 14 dwt. gold and 17 oz. 14 dwt. platinum, including iridium, was recovered. The Tulameen river crosses the peridotite and pyroxenite rocks that form part of Olivine and Grasshopper mountains and the British Columbia Department of Mines states that platinum in place associated with chromite has been found in small quantities in the former rock in this locality. Bands of platinum in a peridotite matrix have been also found in the sluice boxes.

The 1934 annual report of the International Nickel Company of Canada, Ltd., states: "The quoted prices per ounce for platinum were fairly level, declining toward the year-end to \$34.00 from about \$38.00 at the beginning of 1934. The price of palladium increased from \$23.00 at the end of 1933 to \$24.00 at the close of 1934.

"The world consumption of new platinum in 1934 is estimated at 200,000 ounces as compared with 175,000 ounces in 1933. The demand continued to be stronger in the industrial and chemical fields as well as in the jewellery field.

"The International Nickel Company is now the world's largest producer of platinum metals and is currently supplying the major portion of the world's requirements of palladium, this metal being in stronger demand particularly in chemical and industrial fields. The demand for palladium for dental and electrical applications increased substantially during the year. Platinum and palladium-bearing alloys are now standard in dental laboratories and in dental use."

The nickel-copper ores mined in the Sudbury area by the Falconbridge Nickel Company, Ltd., also contain platinum metals and this company announced that its Norwegian plant for the separation of precious metals was finished during 1934 and was gradually coming into routine operation.

Mr. Charles Engelhard, President of Messrs. Baker and Co. Inc., New York, comments on the platinum metals as follows: "The consumption of palladium, although less than that of platinum, definitely increased. This metal has been known to science since its discovery by Wollaston in 1803, but it has only been in the last few years of expanding Canadian output that palladium has been available in sufficient volume to make it an important and permanent factor in industry and the arts, and the prospects for a further steady increase in consumption seem most favourable. . . . The larger production of platinum metals from copper-nickel ores, due to the expanding demand for nickel, resulted in Canada maintaining its position as the world's largest producer of palladium, and it is probable that for the first time Canada also became leader in the production of platinum itself. The ability of world markets to absorb the larger production of these precious metals is evidence of their wider recognition in industry and the arts. Although the market for fine diamond jewellery continued below normal, thus restricting the largest traditional outlet for platinum and iridio-platinum, platinum has been used for many rings and other objects normally made in yellow or white gold. There has also been some activity in the resetting in platinum of jewels from outmoded pieces of gold jewellery. . . . In the chemical field a platinum-rhodium alloy has been extensively accepted all over the world as the outstanding

catalyst in the production of nitric acid, and research continues in perfecting the use of platinum as catalyst in the manufacture of sulphuric acid. Cigarette lighters, using platinum salts as catalysts, have become increasingly popular..... The development of palladium leaf, first introduced in 1933, continued during the past year. A lady's vanity case has been created in palladium kid, and two of the smartest American shoe designers are experimenting with the same material for evening slippers; in the bookbinding field palladium leaf as a decorative material has received recognition. Palladium is improving its position in the jewellery field as a natural white gold, and a palladium-silver alloy has been developed for optical frames. It is in dentistry, however, that palladium—most frequently as palladium-gold-copper and palladium-gold-silver-copper alloys—is finding the most important market, owing to its resistance to corrosion, lightness of weight and white colour, together with the fact that the metal costs less than gold. As for rhodium plating, its progress, accomplished after a long period of research, has been most remarkable, and there can be no question that its use is only in the initial stages."

An article "Platinum and its Associated Metals" appearing recently in the "Mining Journal," London, is especially interesting in that it refers to Abyssinia as follows: "Abyssinia whose potentialities in respect of a noticeable production of platinum do not appear to be adequately appreciated. If and when modern appliances and methods can be brought into use, to replace the present primitive and wasteful methods, this output will be a factor to be seriously reckoned with in the platinum world. Quiet but persistent endeavours are being made in that direction....."

Other than Canada, the important platinum producing countries of the world, in the order of the magnitude of recent output, include Russia, Colombia, the Union of South Africa and Abyssinia.

Table 123.—Production of Platinum Group Metals in Canada, 1932, 1933 and 1934

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	\$	Fine ounces	\$
1932				
Ontario.....	27,284	1,097,021	37,613	901,890
British Columbia.....	59	2,372		
Total.....	27,343	1,099,393	37,613	901,890
1933				
Ontario.....	24,746	856,190	31,009	645,043
British Columbia.....	40	1,400		
Total.....	24,786	857,590	31,009	645,043
1934				
Ontario.....	116,177	4,488,712	83,932	1,696,282
British Columbia.....	53	2,051		
Total.....	116,230	4,490,763	83,932	1,699,282

Table 124.—Production of Metals of the Platinum Group, 1925-1934

(From 1887 to 1924 see Mineral Production of Canada, 1928)

Year	Platinum				Palladium	
	Lode		Placer		Fine oz.	\$
	Fine oz.	\$	Fine oz.	\$		
1925.....	8,692	1,027,477	6	715	7,856	608,727
1926.....	9,471	919,349	50	4,258	9,790	626,166
1927.....	11,217	716,653	11	960	11,247	541,319
1928.....	10,483	706,090	49	2,819	11,909	511,998
1929.....	12,491	845,057	28	1,699	12,408	471,614
1930.....	34,007	1,542,490	17	771	29,959	689,217
1931.....	44,725	1,595,117	50	1,783	39,313	786,260
1932.....	27,284	1,097,021	59	2,372	29,727	548,582
1933.....	24,746	856,190	40	1,400	*31,009	645,043
1934.....	116,177	4,488,712	53	2,051	*83,932	1,699,228

*Includes other platinum metals except platinum.

Table 125.—Production of Certain Metals of the Platinum Group, 1925-1934

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1925.....					432	40,242		
1926.....	204	9,969	16	791			14	3,252
1927.....	222	6,853	31	1,073			45	4,945
1928.....	895	20,951	561	16,331			242	78,553
1929.....	3,037	151,850	1,376	66,048			497	119,777
1930.....	(a) 4,133	206,650						
1931.....	(a) 7,605	431,457						
1932.....	(a) 7,886	353,308						
1933 (b).....								
1934 (b).....								

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

(b) Included with palladium as shown in preceding table.

Table 126.—Imports into Canada and Exports of Platinum, 1932, 1933 and 1934

	1932		1933		1934	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
IMPORTS—						
Platinum retorts, pans, etc.....		30		11,809		1,029
Platinum wire, and in bars, strips, etc. (x).....		29,740		49,136		51,530
Platinum crucibles.....		8,638		11,435		11,464
Total.....		38,408		72,350		64,023
EXPORTS—						
Contained in concentrates, etc.....	14,570	1,155,705	29,228	1,168,565	133,072	5,186,489
Platinum, old and scrap.....	50	2,374	189	5,439	410	12,202
Total.....	14,620	1,158,079	29,417	1,174,004	133,482	5,198,691

(x) Includes any other of the platinum metals.

Table 127.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1931-1934

Year	Value	Year	Value
	\$		\$
1931.....	32,140	1933.....	35,714
1932.....	26,928	1934.....	38,307

Table 128.—Platinum Metals Sold in the United States, as Reported by Refiners and Shown by Consuming Industries, 1933 and 1934

(From Minerals Year Book, U.S. Bureau of Mines.)

(In Troy ounces)

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1933						
Chemical.....	14,085	338	82	173	14,678	14
Electrical.....	3,422	5,367	526	30	9,345	9
Dental.....	11,149	15,946	116	19	27,230	25
Jewellery.....	41,263	4,413	3,608	508	49,792	46
Miscellaneous.....	6,274	100	144	258	6,776	6
Total.....	76,193	26,164	4,476	988	107,821	100
1934						
Chemical.....	14,699	285	53	89	15,126	16
Electrical.....	3,587	4,468	544	59	8,658	9
Dental.....	6,776	19,555	69	11	26,411	28
Jewellery.....	32,959	6,015	2,246	380	41,600	43
Miscellaneous.....	3,113	506	164	326	4,109	4
Total.....	61,134	30,829	3,076	865	95,904	100

Table-129.—World Production of Platinum Metals, 1932-1934

(Supplied by *Imperial Institute*)

(Fine ounces)

Country and product	1932	1933	1934	Country and product	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES			
<i>Sierra Leone</i> —				<i>Papua</i> (years ended June 30)—			
Crude platinum.....	531	431	474	Osmiridium (crude).....	1	29	4
				Platinum (crude).....	2	.....	89
<i>Union of South Africa</i> —				<i>U. S. S. R. (Russia)</i> —			
Crude (pt. metals content)	7,766	.....	26,370	Crude platinum (estimated).....	100,000	100,000	100,000
Concentrates (content)....	1,480	2,386	11,372				
Osmiridium (crude).....	6,523	6,712	5,088	<i>Abyssinia</i> —(b)			
				Platinum (crude).....	8,217	6,650	5,612
<i>Canada</i> —				<i>United States</i> —(b)			
Platinum from placers.....	59	40	53	Platinum (crude).....	1,074	1,266	3,720
Recovered from Ontario nickel-copper matte—				New platinum metals recovered by refineries from domestic gold and copper ores—			
Platinum.....	27,284	24,746	116,177	Platinum.....	1,694	1,050	1,062
Palladium.....	29,727	31,009	83,932	Palladium.....	1,147	698	1,271
Other metals.....	7,886			Iridium.....			
				Osmiridium.....	3	9	2
				Others.....			
<i>New South Wales</i> —				<i>Colombia</i> —			
Crude platinum.....	336	113	180	Platinum (crude).....	40,478	45,971	54,768
				<i>Japan</i> —			
<i>Tasmania</i> —				Platinum (crude).....	266	206	118
Osmiridium (crude).....	785	548	488	<i>Belgian Congo</i> —			
				Palladium.....	2,025	559	3,588
<i>New Zealand</i> —				Platinum.....	.....	.....	1,260
Crude platinum.....		4	.....			

(b) Amount registered, which is probably not total production.

(c) Secondary metals were recovered as follows (Troy ounces):—

	1932	1933	1934
Platinum.....	21,635	35,073	35,494
Palladium.....	5,783	4,814	5,606
Iridium.....	3,726	692	1,328
Others.....	1,444	783	1,328

NOTE.—It is estimated by the Department of Mines, Union of South Africa, that the osmiridium produced in these years contained the amounts of the metals mentioned below (fine ounces):—

	1932	1933	1934
Osmium.....	1,603	2,602	1,858
Iridium.....	1,365	2,082	1,706
Ruthenium.....	655	1,071	713
Platinum.....	616	876	670
Rhodium.....	25	30	30

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics, Showing Production by Provinces, Imports, Exports, Prices and World Output Tables on Aluminium, Antimony, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium and Zirconium

1. General Review

Metal-bearing minerals, mined or treated usually by a very few operators, have been grouped in this chapter for consideration as a single industry. The iron and steel industry is one of the larger and better organized in Canada; ores utilized in Canadian iron furnaces are imported either from the Mesabi range in Minnesota, U.S.A., or from the Wabana deposits on Bell Island, Newfoundland. Iron ores consisting of hematite, siderite and magnetite occur in rather extensive deposits in Canada. These ores are usually of lower grade than those imported and their utilization in the Canadian steel industry would necessitate the employment of beneficiation methods. The Canadian aluminium industry is also very important; the production of this metal in the Dominion comes entirely from the province of Quebec. Bauxite, the crude aluminium ore employed in the manufacture of Canadian made aluminium, is mined in foreign countries.

This chapter also includes a summary review of the occurrence and production of antimony, beryllium, cadmium, chromium, lithium, magnesium, manganese, mercury, molybdenum, radium, selenium, tellurium, tin, tungsten and vanadium ores in Canada.

For historical purposes and to provide the interested reader with available data, tables have been prepared for this chapter that set out the known facts regarding domestic and world production of these metals or ores, some of which represent by-products in the major metal mining industries.

Table 130.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1933 and 1934

	1933			1934		
	Number of employees		Salaries and wages	Number of employees		Salaries and wages
	Male	Female	\$	Male	Female	\$
Salaried Employees—						
Total.....	5		3,312	4	1	6,345
Wage-earners—						
Surface.....	13		10,963	29		25,928
Underground.....	6			8		
Mill.....				2		
Total.....	19		10,963	39		25,928
Grand Total.....	24		14,275	43	1	32,273

Table 131.—Average Number of Wage-Earners Employed, by Months, 1933 and 1934

Month	Number 1933	Number 1934
January.....	16	13
February.....	16	36
March.....	13	34
April.....	12	17
May.....	12	25
June.....	19	41
July.....	10	42
August.....	13	44
September.....	13	62
October.....	26	60
November.....	34	45
December.....	31	37

2. Commodity Statistics on Aluminium, Antimony, Beryllium, Bismuth, Cadmium, Calcium, Chromite, Iron Ore, Pig Iron, Ferro-Alloys, Steel and Rolled Products, Lithium, Manganese, Mercury, Molybdenum, Radium-uranium, Selenium, Tellurium, Tin, Tantalum, Titanium, Tungsten Vanadium, Zirconium

ALUMINIUM

Aluminium is a product of the electric furnace; alumina, which has been recovered by chemical means from bauxite, is dissolved in molten cryolite in the electric furnace; a low voltage current decomposes the oxide into metallic aluminium and oxygen, the metal sinking to the bottom of the crucible. All cryolite ore is obtained from Greenland. Aluminium, in addition to its use in the pure state, is alloyed with other metals, including copper, nickel, cobalt, iron, antimony, tin, zinc, beryllium and magnesium. Pure aluminium powder is used in the thermit process to reduce the oxides of certain metals to the metallic state.

It is interesting to note that the Nippon-Manchukuo Aluminium Co. is to utilize Manchurian clay in the manufacture of aluminium, this will be treated by the Suzuki dry process. The capacity of the works, states "Mineral Industry," will at first be 5,000 tons, and at least part of the plant was expected to be operating at the end of 1934. The aluminium works of the South Manchuria Railway Co. will also use Manchurian clay and will employ the same process.

Aluminium ores (bauxite) are not mined in Canada. In 1934 new aluminium was produced in Canada only at the Arvida reduction plant of the Aluminum Company of Canada, Limited, and was reduced from alumina obtained from foreign ores. The company's slag ore plant at Arvida, Quebec, and its reduction works at Shawinigan Falls in the same province were both inactive throughout the year. Production of the company in 1934 comprised aluminium fabricated products made at Shawinigan Falls, Quebec, and aluminium ingot produced at Arvida. Both the Shawinigan fabricating plant and the Arvida reduction works were in continuous operation during the entire year. Owing to the fact that only one Canadian company produces primary aluminium, the statistics relating to smelting operations in this industry have been included with data supplied by smelters producing other non-ferrous metals.

"To-day the capacity of the various aluminium reduction works of the United States, Canada, Scotland, Norway, France, Switzerland, Italy, Austria, Germany, Russia and Spain could supply nearly 400,000 tons of virgin aluminium a year and yet half a century ago barely 50 tons of this metal had been produced at a cost of roughly 30s. a pound. . . . the light alloy has become an essential material for many purposes and cannot be replaced for aeronautical uses. The subject of aluminium alloys deserves separate treatment as the whole future of the aluminium industry is dependent on these light alloys. They are already to aluminium what steel is to iron and some of them hold positions to others as special steels hold to normal steel. It is tolerably well known that almost every ounce of virgin aluminium is produced from bauxite. In fact the bauxite industry was established as a result of the demands of the aluminium industry, just as was the Greenland cryolite industry, which still remains almost entirely dependent on the aluminium industry. However, new supplies of bauxite, or its equivalent—aluminous laterite—are being discovered almost every year in various parts of the world. The best known occurrences are those of the United States and France, but in Europe valuable deposits occur in Hungary, Italy and in Yugoslavia. The aluminous laterites of Dutch and British Guiana are also now well known and those of India, West Africa and East Africa await development. Although the greater part of the world's production of bauxite is used in the aluminium industry, after refining to alumina, for reduction to aluminium, increasingly large quantities of bauxite are used for the preparation of aluminium sulphate and alums; in the manufacture of high grade refractories and abrasives of the emery type; in the manufacture of aluminous cements; and for the decolourisation and deodorisation of kerosene, etc. Roughly 4 tons of bauxite are required for the recovery of one ton of aluminium. . . . actually continues the "Deutsche Bergwerks Zeit" a substitute material has been developed for tin plate, tin ware, and many other uses of tin, which technically and economically is superior. This material is made by a process in which steel or iron plate is given an aluminium coating in a molten bath of aluminium. This aluminium coating is very thin, but is highly resistant against acid attack, and, therefore, particularly suitable for making containers for preserved goods. . . . In another direction, the development of substitute material

for tin is being carried out by a manufacturer or aluminium foil. This development is a method by which both sides of paper can be given a coating of aluminium foil, rendering it perfectly impervious to air and moisture and very suitable for enclosing preserved foods. The advantage of the material is a great saving in weight compared to the use of tinned containers.⁷¹

The United States Bureau of Mines reports that in the automobile industry aluminium is finding increased use in the construction of trailers and chiefly as a result of recent disasters at sea, the use of various metals, including aluminium, is receiving serious consideration for bulkheads and cabin construction. Cabin walls constructed of layers of aluminium sheet with cellular asbestos are claimed to be not only fireproof but to reduce materially the weight of walls.

"A huge aluminium works has started working in Dniepropetrovsk. This is the biggest enterprise of the aluminium industry. . . . it has an output capacity of 40,000 tons of aluminium per annum. The Dniepropetrovsk works was begun in 1931 and cost about 200 million rubles. It is now the largest aluminium producing works in the Union. Enormous reserves of the necessary raw material (bauxite) have been discovered on U.S.S.R. territory and as there was no known source of natural cryolite in the Union, a works was built for the production of synthetic cryolite."⁷²

Table 132.—Imports into Canada and Exports of Aluminium, Alumina, Bauxite, and Cryolite, 1933 and 1934

	1933		1934	
	Cwt.	\$	Cwt.	\$
IMPORTS—				
Alumina.....	753	8,461	1,052	12,235
Bauxite.....	1,050,641	1,750,230	1,639,070	2,170,778
Cryolite.....	47,327	204,357	3,345	27,718
Aluminium in pigs, ingots, blocks, notch bars, slabs, billets and blooms.....	1,091	26,882	796	18,907
Aluminium scrap.....	1,394	21,794	3,520*	45,174
Aluminium in bars, rods and wire.....	452	14,570	2,480	78,155
Aluminium in plates, sheets and strips, including circles.....	7,993	239,395	12,198	336,469
Aluminium pipes and tubes.....	463	21,439	805	38,694
Aluminium leaf, less than .005 mm. thick*.....				2,023
Aluminium kitchen or household hollow-ware, n.o.p.....		61,428		92,411
Aluminium, manufactures of, n.o.p.....		405,103		433,797
Aluminium leaf, n.o.p., or foil less than .005 inch thick, plain or embossed.....		40,579		53,470
Aluminium powder..... lb.	30,073	14,382	109,673	48,137
Other.....		4,768		4,360
Total Aluminium and its Products.....		2,813,388		3,362,428
EXPORTS—				
Aluminium scrap.....	14,988	176,269	27,969	354,617
Aluminium in bars, blocks, etc.—				
To United Kingdom.....	228,607	4,035,786	264,946	4,566,765
United States.....	17,464	284,265	30,499	502,995
Argentina.....	3,031	60,251	284	6,517
Brazil.....	1,562	34,292	344	7,294
China.....	5,709	103,359	72	2,611
Australia.....	232	4,686	3,055	72,991
Japan.....	77,728	1,358,987	74,940	1,233,867
Netherlands.....			22,669	375,383
British India.....	954	22,719	17,808	375,356
Belgium.....	1,222	22,637	632	13,594
Mexico.....	987	21,195	474	10,711
Other countries.....	1,639	31,811	1,747	38,457
Total in bars, blocks, etc.....	339,135	5,979,988	417,470	7,206,541
Aluminium kitchen utensils and hollow-ware.....		8,634		11,920
Aluminium, manufacture of, n.o.p.....		137,083		434,564
Total Aluminium and its Products.....		6,301,974		8,007,642

* From April 15, 1934.

(¹) The Mining Journal—London. (²) U.S.S.R. Chamber of Commerce—Moscow.

Table 133.—Estimated World Production of Aluminium, 1932-1934

(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934
BRITISH EMPIRE			
United Kingdom.....	10,000	10,800	12,700
Canada.....	17,500	15,900	15,500
Total.....	27,500	26,700	28,200
FOREIGN COUNTRIES			
Austria.....	2,000	2,100	2,000
France.....	14,133	14,300	14,835
Germany.....	18,700	18,650	(c) 36,596
Italy (c).....	13,201	11,880	12,643
Norway (c).....	17,506	15,141	15,104
U.S.S.R. (Russian).....	1,000	3,000	13,000
Spain.....	(c) 1,136	(c) 1,136	1,211
Switzerland.....	8,000	7,400	8,000
United States (b) (c).....	46,824	38,003	33,115
Sweden (c).....		9	292
Total.....	123,000	111,000	136,000
World's Total.....	150,000	138,000	164,000

(a) Information not available.

(c) Official figures.

(b) Secondary metal was recovered as follows:—

1932.....	21,400 long tons
1933.....	29,900 "
1934.....	41,400 "

Table 134.—World Production of Bauxite, 1932-1934

(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
Northern Ireland.....			57	Greece.....	581		(a)
British Guiana (c).....	1,473	698		Hungary.....	109,796	71,281	182,069
60% or over alumina....	65,107	32,441	50,998	Italy.....	85,186	93,320	129,193
50-60% alumina.....		716	2,225	Yugoslavia.....	66,024	85,274	83,488
30 to 50% alumina (b) ..	18,396	8,172	11,666	Roumania.....	602	1,138	1,435
India.....	4,467	1,075	18	Spain.....	1,300	2,500	(a)
Australia.....	1,129	670	158	U.S.S.R. (Russia).....	36,800	49,800	60,000
Total.....	91,000	41,000	65,000	United States.....	96,349	154,176	157,838
FOREIGN COUNTRIES—				Dutch Guiana (d).....	124,522	104,697	99,412
France.....	395,100	470,243	530,618	Total*.....	920,000	1,040,000	1,180,000
Germany.....	1,612	(e) 5,000	6,456	World's Total*.....	1,010,000	1,080,000	1,250,000

* Excluding the production in Austria, statistics of which are not available.

(a) Information not available.

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows:—

	1932	1933	1934
Metallurgical.....	40,278	10,273	20,406
Chemical.....	22,129	25,095	28,181
Refractory.....	102	716	1,775

(d) Exports.

(e) Estimated.

Table 135.—Production (Exports) of Cryolite from Greenland, 1930-1934

Long tons

1930.....	35,671
1931.....	17,427
1932.....	17,592
1933.....	10,187
1934.....	14,999

NOTE.—It was reported in 1935 that the manufacture of synthetic cryolite was well advanced in Germany.

ANTIMONY

Minerals containing antimony occur in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia, also in the Yukon. No sales or shipments of antimony ores have been reported in Canada since 1917 and no by-product production of the metal since 1926 in which year it was recorded as a metal content of silver-lead-bismuth bullion obtained in the treatment of ores from the Cobalt district. The greater part of the Canadian output of refined antimony was produced at Trail, British Columbia, in the years 1907, 1909, 1915 and 1916 by the Consolidated Mining and Smelting Company of Canada, Limited; the metal was recovered as a by-product in the treatment of silver-lead ores.

World production of antimony increased considerably during 1934 together with higher prices and an increased demand for the metal. In China, the world's principal antimony producer, the state monopoly of antimony production was reinstated and prices increased.

It was recently announced that the large deposits of 40 per cent antimony ore developed at Turgai, Kazakstan, have been selected as a principal source of the metal in Russia.

Antimony is employed largely as an alloying element in bearing metals and in the manufacture of storage batteries and paints. Its power in reducing the shrinkage of crystallization in lead has favoured its utilization in type metal alloys; the metal in the liquid state also possesses practically the same volume as when solid.

The average price for antimony on the New York market in 1934 was 8.901 cents per pound as compared with a price of 6.528 cents in 1933 and 5.592 cents in 1932.

Table 135(a).—Production of Antimony in Canada, 1911-1934

Year	Antimony ore		Refined regulus		Antimony in silver-lead-bismuth bullion exported	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1911-1914.....						
1915.....	1,341	81,283	59,440	11,888		
1916.....	885	94,537	107,185	41,823		
1917.....	361	22,000				
1918-1924.....						
1925.....					1,751	206
1926.....					1,596	281
1927-1934.....						

NOTE.—For years 1886 to 1910 see previous reports.

Table 136.—Imports of Antimony and Antimony Products into Canada, 1933 and 1934

	1933		1934	
	Pounds	\$	Pounds	\$
Antimony or regulus of, not ground, pulverized or otherwise treated.....	626,854	32,796	625,432	45,124
Antimony oxide and titanium oxide*.....			983,539	131,005
Antimony salts—tartar emetic, etc.....	28,861	4,371	41,926	5,297
Antimony salts for dyeing.....	57,138	2,288	112	43

* From April 1, 1934.

Table 137.—World Production of Antimony Ore, 1932-1934

(In terms of metal)
(Supplied by Imperial Institute)
(Long tons)

Producing country	1932	1933	1934	Producing country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Australia.....	60	47	9	Algeria.....	231	100	650
FOREIGN COUNTRIES				Morocco (Spanish).....	100	40	(a)
United States (c).....	374	524	361	Mexico.....	1,317	1,919	2,626
Czechoslovakia.....	588	1,341	1,142	Bolivia (exports).....	1,446	1,866	1,182
France.....	627	300	261	Peru.....	14	18	73
Greece.....	325	168	(a)	China.....	12,191	12,600	(b) 16,466
Italy.....	372	358	346	Turkey.....		44	(a)
Argentina.....		12	(a)	Japan (ore).....	66	133	106
				Korea (ore).....	7	21	

(a) Information not available.

(b) Interport exports.

(c) Secondary metal was recovered as follows:—

1932.....	5,800 long tons
1933.....	6,600 "
1934.....	6,700 "

BERYLLIUM

The principal ore of beryllium is the mineral beryl— $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$. There are several known occurrences of this mineral in Canada and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. No beryl mining operations in Canada were reported in 1934.

"The use of beryllium increased approximately fourfold during 1933. Beryllium-copper alloys continued to provide the principal commercial outlet for the metal, and approximately 90 per cent of the domestic consumption was used for this purpose. Another growing application is the utilization of beryllium oxide as a refractory. A considerable part of the beryl supply in the United States was drawn from the Black Hills of South Dakota, but additional quantities were obtained from scattered pegmatites in other states. Arrangements were perfected for obtaining additional quantities of beryl from British India, and deposits in other foreign countries were investigated as potential sources. The raw material situation does not indicate that beryllium is likely to become a cheap metal soon, but possibilities are that its use will continue to grow at an accelerated pace, and resulting savings in cost will be shared by consumers. . . . The discovery of large deposits of beryl in the Ghedem Mountains in Eritrea was reported; reports from Germany indicate that investigations in the laboratories of Heraeus-Vacuum Smelz A/G., of Hanau have resulted in the successful reduction of beryllium directly from its oxide to copper or nickel alloys. . . . A tract on the west side of the Cordon de la Bolsain the Sierra de la Madera Montezuma municipality in the State of Sonora, Mexico, was declared by the ministry to be part of the national mineral reserves for the exploitation of beryllium. The consumption of beryl in the United States increased to approximately 35 tons monthly at the end of 1933."¹

The tensile strength of annealed copper is about 33,000 pounds per square inch and it is stated that by adding 1.5 to 2.5 per cent beryllium and by heat treatment the tensile strength can be raised to 200,000 pounds per square inch.

"To a notable extent beryllium possesses the capacity for hardening most of the common metals even when present in small proportions and although its present cost is somewhat prohibitive (at a figure approximating to 30s. per pound) that is a factory of development which will change favourably as time and use bring it into greater demand following upon a widening recognition of its valuable properties. As has been the case with other metals in the "rare" list, those who have had its development in hand have hedged themselves around with protective patents or other devices, whilst the process of production has been and is specialized and difficult owing to its affinity for oxygen. Whilst this feature has made it an effective deoxydizer of other metals, it has created many difficulties in the attempt to reduce it to metallic form. Beryllium bronzes would appear to have a bright future. Much more will be heard both of beryl and beryllium."²

It is interesting to note that the value of beryl crystals produced in the Union of South Africa during 1934 totalled £10,608 as compared with a value of £4,220 in 1933.

Metal and Mineral Markets, New York, September, 1935, quotations for beryllium ore were—per ton carload lots, minimum 10 per cent BeO \$30; minimum 12 per cent, \$35, f.o.b. mines. Beryllium copper-master alloy, 3.5 per cent beryllium, remainder copper, in lots of 250 lb. or more beryllium \$25 per pound of contained beryllium.

BISMUTH

Bismuth occurs in small quantities with ores of the Cobalt district in Ontario and in ores treated at the Trail smelter in British Columbia.

Production of new bismuth in Canada in 1934 totalled 253,644 pounds valued at \$301,215 as compared with 78,303 pounds worth \$81,526 in 1933 and 16,855 pounds at \$7,340 in 1932. The production in each of the three years consisted of the metal contained in silver-lead-bismuth bullion exported by the Deloro Smelting and Refining Company, Limited, Deloro, Ontario, and metallic bismuth produced at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. Output of the metal during the first six months of 1935 amounted to only 4,244 pounds valued at \$3,109 as against 79,525 pounds worth \$110,541 during the corresponding period of 1934.

¹ Excerpts from United States Bureau of Mines 1934 Minerals Year Book.

² Excerpts from "The Mining Journal", London.

Bismuth is utilized in the manufacture of various low melting alloys, including some solders, and in the production of astringents and various chemical products. It was reported in 1934 that possible bismuth supplies were considerably in excess of present requirements for the metal. Peru, Spain, Canada, Germany, Japan and Mexico are the principal bismuth producing countries.

Imports into Canada in 1934 of bismuth metal totalled 4,046 pounds valued at \$4,864 as compared with 180 pounds worth \$198 in 1933. Bismuth salts imported during 1934 were valued at \$22,010 as against a value of \$25,255 in 1933.

"Metal and Mineral Markets" quoted metallic bismuth, September, 1935, New York, at 90 cents per pound ton lots. London, 3s. 6d.

Table 138.—World Production* of Bismuth, 1932-1934

(Supplied by *Imperial Institute*)

(Cwt.=112 pounds)

Producing country and description	1932	1933	1934
BRITISH EMPIRE			
Canada—metal and content of bullion.....	150	699	2,265
India—(ore).....	27 lb.	80 lb.	.....
Australia—(ore, etc.).....	405	53	300
FOREIGN COUNTRIES			
Germany (Saxony)—(Bismuth, cobalt-nickel ore).....	2,154	.....	(a)
Spain—(ore).....	650	1,516	3,543
(metal).....	669	512	905
Mexico—ore (bi-content).....	343	923	2,033
Bolivia (exports)—(Content of ore and concentrates).....	46	37	993
Peru—			
Lead, Silver bullion etc. (Bi content).....	1,192	1,607	2,358
Metal.....	376	4,149	3,010
China—(ore (bi-content).....	400	400	400
Japan—(metal).....	938	1,124	991

* Bismuth is also recovered as a by-product in the United States, United Kingdom, France, Sweden and U.S.S.R. (Russia).

(a) Information not available.

CADMIUM

Cadmium was produced in Canada for the first time in 1928 at the Trail refinery of the Consolidated Mining and Smelting Company, Limited, as a by-product on the refining of zinc.

Cadmium production in Canada during 1934 was valued at \$95,665 as compared with \$78,733 in 1933 and \$26,824 in 1932. The entire Canadian output of this metal is obtained at Trail, British Columbia, in the treatment of zinc bearing ores by the Consolidated Mining and Smelting Company of Canada, Ltd. Both the cadmium and bismuth plants of this company are by-product works and are only operated as occasion demands. Cadmium precipitate is obtained in the electrolytic zinc refining operations of the Hudson Bay Mining and Smelting Company, Limited, at Flin Flon, Manitoba; the amount of this precipitate on hand at the end of 1934 totalled 5,495 tons containing 3.63 per cent cadmium, 6.76 per cent copper, and 55.0 per cent zinc.

One of the principal industrial uses at present for cadmium is as a plating metal in automobile and aeroplane manufacture; it is also utilized in the preparation of pigments. Excellent results have been claimed for cadmium base alloys; new cadmium alloys reported in the United States include a cadmium-silver-copper bearing, for which greater efficiency is claimed compared with babbitt metal and a cadmium-nickel bearing which utilizes cadmium for a base and contains about 1.3 per cent of nickel; this latter alloy is now being tested in the automobile industry. The metal is also used in low melting alloys.

The United States Bureau of Mines reports the production of metallic cadmium in the United States during 1934 at 2,777,384 pounds, an increase of 22 per cent over 1933. In addition to metallic cadmium, United States manufacturers reported production of the following cadmium compounds: cadmium sulphide, cadmium oxide, cadmium lithopone, cadmium selenide (cad-

mium red), cadmium hydrate, cadmium sulphate, and cadmium carbonate—the cadmium content of which was 566,700 pounds in 1934 compared with 401,400 pounds of cadmium in compounds in 1933, an increase of 41 per cent. Imports for consumption of cadmium metal into the United States in 1934 amounted to 125,955 pounds, of which 76,889 pounds were from Norway, 29,153 pounds from Germany, 11,094 pounds from Belgium and 8,819 pounds from Netherlands.

It was announced in February, 1935, by the U.S.S.R. Chamber of Commerce, Moscow, that the experimental electrolytic works of the Ridder combine had developed a process of producing cadmium by electrolysis.

“Metal and Mineral Markets”—New York, reported cadmium—New York—at 85 cents per pound, September 20th, 1935. London, 4s. nominal.

Table 139.—Cadmium Production* in Canada, 1928-1934

Year	Pounds	\$
1928.....	491,894	341,374
1929.....	773,976	675,294
1930.....	456,582	337,871
1931.....	323,139	180,958
1932.....	65,425	26,824
1933.....	246,041	78,733
1934.....	293,611	95,665

* Produced in British Columbia. In addition cadmium precipitate was produced and stored by the Hudson Bay Mining and Smelting Co., Ltd., at Flin Flon, Manitoba.

Table 140.—World Production of Cadmium, 1932-1934

(Supplied by *Imperial Institute*)

(Lb. avdp.)

Country	1932	1933	1934
BRITISH EMPIRE			
Canada.....	122,822	(c) 246,041	(c) 294,000
Australia.....	354,620	357,313	380,493
South West Africa (d).....			140,000
FOREIGN COUNTRIES			
Belgium.....	274,451	355,000	498,245
France.....	108,000	88,000	.....
Italy.....	13,752	15,287	17,600
United States—			
Metal.....	799,501	2,276,933	2,777,384
Compounds (metal content).....	259,800	401,400	566,700
Mexico (b).....	189,981	2,848,079	848,149
U.S.S.R. (Russia).....	(a)	(a)	5,700

Cadmium is also produced in Germany, Norway, Poland, Sweden and Japan.

(a) Information not available.

(b) Including cadmium content of flue dust, etc., exported for treatment.

(c) Excluding cadmium sponge produced at Flin Flon, Manitoba.

(d) Cadmium content of shipments of dust from the smelters to Germany.

CALCIUM

Metallic calcium, produced by the electrolysis of the fused chloride, is gradually acquiring new commercial applications. Among the more important of these are the debismuthizing of lead (the Betterton process); the hardening of lead for various purposes, particularly bearing metals and cable coverings; as a deoxidizer for copper and its alloys, and for cast iron and steel; as a constituent of aluminium alloys for forging and casting; as a reducing agent for oxides of beryllium, chromium, thorium and uranium; as a desulphurizing agent in petroleum refining; and as an absorbent of residual gases in vacuum tubes.¹ The metal has not yet been produced in Canada.

¹ The Mineral Industry.

CHROMITE

The output of chromite in Canada in 1934 amounted to 111 tons valued at \$1,578 as compared with 30 tons worth \$343 in 1933. The production in 1934 came entirely from the Eastern Townships of Quebec and from the Obonga Lake area, Thunder Bay district, Ontario.

In 1932 chromite deposits, located a few miles north of Clinton, British Columbia, were under development and considerable work of an exploratory nature was recently conducted on chromite occurrences in the Obonga Lake area, situated some miles north of the city of Port Arthur, Ontario.

The Ontario Department of Mines reported development, to the end of 1934, on the Obonga Lake property of Chromium Mining and Smelting Corporation, Ltd., included one two-compartment shaft, 350 feet deep, and about 600 feet of lateral work on the 100 foot level; a second shaft, 25 feet deep; about 3,000 feet of surface trenching; and 33 diamond drill holes, with a total footage of 6,150 feet. Shipments of ore were made in 1934 and the first half of 1935 to a smelter located at Niagara Falls, New York, and in August, 1935, it was announced that the Chromium Mining and Smelting Corporation, Ltd., had commenced smelting operations at Sault Ste. Marie, Ontario, where ferro-chromium will be produced.

The three principal uses for chromite are: (1) for the production of ferro-chromium; (2) for the production of bichromates and other chemical compounds of chromium, and recently the chemicals used in electroplating with chromium; and (3) as a refractory.

Chromium is a very important constituent of the so-called stainless steel alloys and the familiar heating element "nichrome" is an alloy containing approximately 20 per cent chromium. There is also a demand for chromium bronzes and chromium aluminium, both of which are characterized by high tensile strength. Chromite is utilized in the manufacture of emerald green glass and chrome oxide is extensively employed in the ceramic industry for black, green and brown glazes. Bichromate of soda is used in the tanning of light leathers and, as an oxidizing agent, is utilized in the manufacture of dyes and other synthetic chemicals.

"Metal and Mineral Markets," New York, September quotations, 1935, were as follows:—Chromium, per pound, 97 per cent grade, spot, 88 cents; contract, 83 cents per pound contained chromium, maximum 1 or 2 per cent iron (usually sold as ferro-chrome).

Chrome Ore—per long ton, c.i.f. Atlantic ports, \$15.50 to \$16.50 for 45 to 47 per cent Cr_2O_3 ore, and \$18.50 to \$19.50 for 48 to 50 per cent ore. Ferro-chrome, per pound of contained chromium, 4 to 6 per cent carbon, 66 to 70 per cent chromium, 10 cents, delivered on contracts.

Table 141.—Production of Chromite in Canada, 1924-1934

Year	Short tons	Value
1924-1928.....		\$
1929.....		
1930.....	126	900
1931.....		
1932.....		
1933.....	78	1,113
1934.....	30	343
	111	1,578

NOTE.—For years 1886 to 1923 see previous reports.

Table 142.—Imports of Chromium and Chromium Products into Canada, 1933 and 1934

	1933		1934	
	Quantity	\$	Quantity	\$
Chromium metal and tungsten metal, in lumps, etc., when imported by manufacturers for alloying purposes..... lb.	17,755	8,801	26,222	16,461
Nickel chromium in bars or rods not more than 0.75 inch diam., containing 60% nickel and 10% chromium for use as electric resistance wire, etc..... lb.	50,841	46,210	48,413	45,114
Chrome fire brick.....		38,431		39,184
Bichromate of potash—crude..... lb.	113,607	9,013	139,865	11,684
Bichromate of soda..... lb.	1,858,424	87,558	2,374,311	138,313

Table 143.—World Production of Chrome Ore, 1932-1934(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Southern Rhodesia.....	15,445	34,493	70,961	Cuba.....	500	21,837	(d) 49,370
Union of South Africa.....	19,065	33,541	44,560	United States.....	200	966	341
Cyprus.....	(c) 1,000	.....	966	Roumania.....	.....	29	.....
Canada.....	70	27	99	Japan.....	12,295	19,681	26,792
India.....	17,865	15,526	21,576	Turkey.....	54,344	74,188	143,800
Australia.....	97	891	1,716	New Caledonia.....	68,332	49,100	54,300
Total.....	54,000	84,000	140,000	Guatemala (d).....	.....	2,061	792
FOREIGN COUNTRIES				Total.....	240,000	319,000	(a)
Greece.....	1,530	14,550	(a)	World's Total.....	294,000	403,000	(a)
Yugoslavia.....	38,524	25,062	46,540				
Norway.....	403	321	41				
U.S.S.R. (Russia).....	64,200	110,900	(a)				

(a) Information not available.

(c) Estimated.

(d) Imports into the United States from the country indicated.

IRON ORE

Iron ore was first discovered in Canada in the St. Maurice valley, Quebec, as early as 1667, or perhaps earlier. Count Frontenac mined ore there five years later and the samples, tested in France, were found to be of workable quality.

In 1730 M. Francheville was granted a licence by Louis XIV of France together with a subsidy of 10,000 "livres" to work the St. Maurice iron mines. The project contemplated the construction of a blast furnace which apparently was not successful for, in 1735, he surrendered his rights to the government. Some years later another licence and a subsidy were given La Compagnie des Forges which made not only the iron kettles that were needed by the pioneers for making sugar and soap but furnished the French government with cannon for military enterprises. In 1743 the plant again reverted to the crown and was operated by the government until the country passed into the hands of the British.

Nova Scotia, with its large iron and steel industry, is not at present a producer of iron ore. The large deposits of high-grade ore in Newfoundland owned and operated by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia and for that reason the local deposits are not mined.

Iron ore mining and smelting were carried on to a small extent in New Brunswick but the ore was low-grade and the operations did not prosper.

Iron ore was first mined and smelted in the province of Quebec early in the eighteenth century, and from that time until 1883 the industry was carried on almost continuously at Three Rivers in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and at Drummondville, the last to shut down being the Drummondville furnace in 1911. The ores used were bog ores, with charcoal for fuel. The output of all the furnaces was small and the industry owed its success to the superior quality of the pig iron produced.

Furnaces have also been built at various times and places in attempts to smelt some of the other classes of ore found in the province; these were all short lived, and none achieved commercial success.

In Ontario the first iron furnace was erected in Leeds county in 1800 and in 1822 iron smelting operations were commenced at Normandale, Norfolk county; these ceased in 1847.

In northwestern Ontario about 1899, a deposit of hematite, that later developed into the Helen mine, was found, this mine proved the main source of Ontario's iron output for a number of years. The high grade ore was exhausted and the mine is now closed down. Ontario has a large supply of low-grade iron ore, but beneficiation processes must be applied to make these ores suitable for commercial use.

Production of iron ore in British Columbia had been almost negligible up to the present time, however, the small production has not been caused so much by the lack of ore as by the scarcity of a market for the ore.

There are no known large bodies of high-grade iron ore in Canada that could be made tributary to present Canadian furnaces. There are, however, two very large partly developed, but unequipped deposits of low-grade ore in Ontario. The Algoma Steel Corporation's New Helen mine in the Michipicoten district has proved reserves variously estimated at 60,000,000 to 80,000,000 tons of low-grade rather sulphury iron carbonate that requires roasting to fit it for use in the blast furnace. A similar ore was formerly worked by the same company at their Magpie mine, also in the Michipicoten district, but this is not at present profitable. In the Sudbury district, Moose Mountain, Ltd., have developed some 33,000,000 tons of proved and probable ore, consisting of low-grade siliceous magnetite carrying in its natural state about 35 per cent of iron. For a number of years it was attempted to work the Moose Mountain ore by a process of magnetic separation and sintering, but in spite of the exceptionally high-grade of the finished product it was found impossible to bring costs down to the point where a profit could be made in competition with available natural ores of foreign origin.

Table 144.—Shipments of Iron and Titanium Ores from Canadian Mines, by Provinces, 1924-1934

(For years 1886 to 1923 see Mineral Production of Canada, 1928)
(Short tons)

Year	Quebec	Ontario	British Columbia	Canada
1924.....	1,408	44	28	1,480
1925*.....	3,978			3,978
1926.....	200			200
1927.....	2,029			2,029
1928.....	2,244			2,244
1929.....	2,748			2,748
1930.....	412			412
1931.....	1,509			1,509
1932.....				
1933.....				
1934.....	2,023			2,023

* 1925-1934—shipments consist of titaniferous ore.

Table 145.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1925-1934

(For years 1895 to 1924 see Mineral Production of Canada, 1928)

Year	To Nova Scotia	To United States	To Europe	Total shipments
	Short tons	Short tons	Short tons	Short tons
1925.....	384,795		883,056	1,267,851
1926.....	465,961		503,640	969,601
1927.....	480,757	68,354	946,569	1,495,680
1928.....	690,316	41,493	1,001,833	1,733,642
1929.....	763,168	85,501	850,370	1,699,039
1930*.....	523,918	54,623	740,774	1,319,315
1931.....	234,148	25,670	530,079	789,897
1932*.....			166,303	166,303
1933.....			254,383	254,383
1934*.....	346,178		344,769	690,947

* European shipments in 1930, 1932 and 1934 were to Germany only.

Table 146.—Imports into Canada, and Exports of Iron Ore, 1933-1934

	1933		1934	
	Quantity	Value	Quantity	Value
	Short tons	\$	Short tons	\$
IMPORTS—				
Iron ore from United States.....	176,261	343,395	684,581	1,257,745
Iron ore from French Africa.....	21,627	42,706		
Iron ore from other countries*.....	7,515	14,046	292,760	569,563
Total.....	205,403	400,147	977,341	1,827,308
EXPORTS— Total.....	1,774	1,563	3,311	12,383

* In 1934, 265,661 tons at \$473,161 were imported from Newfoundland.

Table 147.—World Production of Iron Ore

(Supplied by Imperial Institute, London)
(Including Manganiferous Iron ore)
(Long tons)

Producing Country	Ore			Estimated Iron Content		
	1932	1933	1934	1932	1933	1934
BRITISH EMPIRE						
United Kingdom (c).....	7,328,190	7,461,720	10,586,846	2,198,500	2,238,516	3,176,054
Northern Rhodesia.....	711			464		
Sierra Leone (exports).....		24,550	210,645		16,000	120,100
Union of South Africa.....	31,196	67,496	229,494		24,609	141,391
Newfoundland.....	317,858	320,891	506,616	165,000		263,000
India.....	1,760,501	1,228,625	1,916,918	1,130,000	790,000	1,230,000
Unfederated Malay States.....	688,179	766,472	1,135,649	440,000	490,000	730,000
Australia.....	546,160	736,604	1,247,465	360,000	482,000	823,000
New Zealand.....		6,872	2,806		3,600	1,300
Total.....	10,700,000	10,600,000	15,800,000			
FOREIGN COUNTRIES						
Austria.....	301,951	262,814	459,462	105,419	92,554	160,687
Belgium.....	91,344	104,523	114,060	41,000	47,000	(a)
Czechoslovakia.....	592,704	422,000	530,233	192,786	136,965	174,265
France.....	27,163,427	29,728,996	31,695,690	9,000,000	10,000,000	11,000,000
Germany.....	1,318,600	2,550,513	4,274,092	435,736	815,316	1,350,639
Greece.....	45,295	83,875	(a)	20,600	38,063	(a)
Hungary.....	52,029	49,231	67,775	18,054	17,942	24,496
Italy.....	417,368	517,294	494,153	209,546	259,355	247,000
Luxemburg.....	3,161,879	3,309,312	3,771,328	983,050	1,019,480	1,155,197
Norway.....	368,002	466,379	558,452	241,044	304,476	362,562
Poland.....	75,901	270,161	243,458	20,000	84,000	77,000
Portugal.....		4,400	2,849		2,100	1,300
Roumania.....	7,924	13,613	82,270	3,600	6,058	40,000
Spain.....	1,732,667	1,786,811	2,060,929	790,000	830,000	870,000
Sweden.....	3,246,886	2,656,127	5,170,093	2,000,000	1,659,000	3,200,000
Switzerland (exports).....	11,675	6,977	18,661	(a)	(a)	(a)
U.S.S.R. (Russia).....	12,000,000	14,000,000	21,000,000	(a)	(a)	(a)
Yugoslavia.....	26,214	50,925	176,971	13,737	26,685	86,200
Algeria.....	459,560	749,426	1,305,488	230,000	375,000	691,909
Belgian Congo.....		69	(a)		(a)	(a)
Egypt.....	25		200	(a)		(a)
Morocco (Spanish).....	168,479	507,692	811,785	93,000	279,000	(a)
Tunis.....	206,000	286,000	537,900	106,000	148,000	277,000
Cuba.....	185,248	275,197	(a)	85,200	126,600	(a)
Mexico.....	26,694	76,486	104,128	17,000	48,950	66,648
United States (b).....	9,872,350	17,744,819	24,809,438	4,900,000	8,800,000	12,400,000
Brazil (estimated).....	30,000	30,000	30,000	20,000	20,000	20,000
Chile.....	168,420	556,246	957,800	111,000	344,316	622,000
China.....	1,232,816	1,260,000	(a)	490,000	500,000	(a)
French Indo-China.....		405	1,512		222	692
Japan.....	223,141	315,605	424,863	(a)	(a)	(a)
Korea.....	149,022	254,188	173,228	82,000	148,000	117,000
"Manchoukuo".....	1,025,163	1,158,060	(a)	510,000	580,000	(a)
Total.....	64,000,000	79,000,000	101,000,000			
World's Total.....	75,000,000	90,000,000	117,000,000			

(a) Information not available.

(b) Including shipments of manganiferous iron ore up to 35 p.c. Mn.

(c) In addition, bog ore and iron ore (not used for smelting) were produced as follows:—

1932.....	9,533 long tons
1933.....	8,256 "
1934.....	9,709 "

IRON AND STEEL AND THEIR PRODUCTS**The Primary Iron and Steel Industry**

Statistics for the primary iron and steel industry cover the operations of plants engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and direct steel castings, (d) rolled and drawn iron and steel products such as bars, plates, sheets, strips, rails, wire rods, structural shapes, etc. Thirty-seven firms were included in this industry in 1934 and reports were received for 51 different plants or departments, including 4 blast furnace departments, 3 ferro-alloy plants, 27 steel furnace divisions and 17 rolling or drawing mills. Two steel furnace departments and 2 rolling mills were idle during 1934.

Factory sales of pig iron, steel, ferro-alloys and rolled products were 57 per cent higher in 1934 than in 1933, the values being \$29,101,463 and \$18,492,549 respectively. The 22 works in Ontario reported sales at \$18,037,559 or 62 per cent of the total for Canada; 6 works in Nova Scotia accounted for \$6,701,638 or 23 per cent, and 14 plants in Quebec had total sales worth \$3,343,686 or 12 per cent of the total. There were also 4 operating plants in Manitoba, 2 in Alberta and 4 in British Columbia.

Capital employed in 1934 was reported at \$90,079,004, of which \$68,005,714 represented the value of land, buildings and plant equipment, \$5,650,877 was the value placed on materials on hand and in process, \$8,361,807 was the inventory value of finished products on hand, and \$8,060,606 was the total of operating capital such as cash, bills receivable, etc., as at the end of the year. The total for Ontario was \$57,803,304; for Nova Scotia, \$18,973,518; for Quebec, \$10,986,806, for Manitoba, \$1,676,263; and for Alberta and British Columbia, \$639,113.

The average number of employees in the primary iron and steel plants was 7,400 in 1934 compared with 5,200 in 1933. About 552 workers were employed in blast furnace departments, 245 in ferro-alloy plants, 2,069 on steel furnaces and 4,534 in rolling mills. About 58 per cent, or 4,306, of these workers were employed in Ontario, 1,456 in Quebec, 1,297 in Nova Scotia, 283 in Manitoba and 58 in Alberta and British Columbia.

Payments in salaries and wages amounted to \$9,009,512 in 1934, an increase of 49 per cent over the total of \$6,049,189 for 1933. The average wage per wage-earner was \$1,136 in 1934 compared with \$1,050 in 1933, indicating some increase in actual working time as well as in working staff.

Expenditures for fuel and electricity totalled \$3,969,136 in 1934 compared with \$2,699,837 in the previous year. Electricity alone cost \$1,148,554 in 1934 and \$872,857 in 1933.

(a) **Pig Iron.**—Production of pig iron increased by 78 per cent in 1934 to 404,995 long tons as compared with 227,317 tons in 1933 and 144,130 tons in 1932. Output of basic iron was given at 310,631 tons or 77 per cent of the total; malleable iron amounted to 43,441 tons and the foundry grade to 50,923 tons.

Sales of pig iron by the producers totalled 97,440 tons at \$1,856,284 in 1934 as against 76,507 tons at \$1,402,903 in the previous year. Transfers (including some from stock) of pig iron to the other departments of the producing companies amounted to 350,906 tons or 127 per cent more than in 1933.

Imports of pig iron during 1934 advanced to 6,419 long tons from 2,459 tons in 1933 and exports declined to 9,221 tons from 11,903 tons. Stocks held by the producers declined to 65,637 tons at the end of 1934 from 109,507 tons at the close of 1933. The apparent consumption of pig iron during the year, as computed from production, imports, exports and changes in stocks, amounted to 446,063 tons compared with 213,641 tons during 1933.

Charges to furnaces in 1934 included 718,237 long tons of iron ore, 37,043 long tons of mill cinder, etc., 12,461 long tons of scrap, 415,462 short tons of coke, and 209,104 short tons of limestone.

The four producers of pig iron in Canada have 11 blast furnaces available for use which, if operated at capacity, could produce 1.5 million tons of pig iron per year. Actual production in 1934 at 404,995 tons was at the rate of about 27 per cent of the rated capacity.

Iron furnaces in blast in January represented 17 per cent of the capacity; this percentage dropped to 11 in February and March and then increased to 24 in April and to 37 in May. A decline in June brought the figure to 26 per cent but in July there was a gain to 34 per cent. In October the year's high of 45 per cent was reached and in the remaining months only 34 per cent of capacity was in blast. Only 5 of the 11 furnaces were used during the year.

(b) **Ferro-Alloys.**—Production of ferro-alloys during 1934 amounted to 29,940 long tons compared with 30,133 tons in 1933 and 16,161 tons in 1932.

In 1934, ferro-silicon was produced by 5 different plants. Three concerns recovered small tonnages of ferro-silicon as a by-product from the manufacture of fused alumina, another company made 50%, 75%, and 90% grades, and another concern made 15%, 50%, 75%, 85%, and 90% grades; the latter company also made large tonnages of ferromanganese and spiegeleisen. One of the pig iron producers made occasional runs of spiegeleisen in their blast furnace, and a chemical manufacturer made some ferrophosphorus.

Imports of ferro-alloys totalled 1,226 long tons at \$247,783 in 1934 as against 467 tons at \$168,394 in 1933.

(c) **Steel Ingots and Castings.**—Steel production advanced 85 per cent in 1934 to 757,782 long tons from 409,979 tons in 1933. The 1934 output included 737,118 tons of ingots and 20,664 tons of castings. Practically all of the ingots were transferred to the producers' own rolling mills, while nearly all of the castings were made for sale. The sales of ingots and castings amounted to 20,139 tons at \$3,228,451 compared with 14,934 tons at \$2,365,171 in the previous year. Transfers to the producers' own works were reported at 737,477 tons as against 394,236 tons in 1933.

Inventories of steel on December 31, 1934, were reported at 20,184 tons of ingots and 1,735 tons of castings, a total of 21,919 tons.

Twenty-seven steel plants were in operation during 1934. Four of these concerns operated basic open hearth furnaces only, 19 used electric furnaces only, 2 used both basic open hearth and electric furnaces and 2 used converters. Five concerns made basic open hearth steel ingots, 4 made electric ingots, 19 made electric steel castings, 3 made basic open hearth castings and 2 made converter castings. These plants reported steel furnace equipment as follows: 42 basic open hearth furnaces with a total daily capacity of 5,186 long tons; 4 converters with total capacity of 932 tons, and 30 electric furnaces with a total capacity of 594 tons. Two plants were idle during the year, 1 electric furnace in Ontario and 1 basic open hearth furnace in Alberta, with a combined capacity of about 87 tons of steel per day.

(d) **Rolled and Drawn Steel.**—In 1934 there were 14 hot rolling mills in operation, 1 cold rolling plant and 2 works for making cold drawn shapes. Nine of these mills were in Ontario, 3 in Quebec, 3 in Nova Scotia, 1 in Manitoba and 1 in Alberta. One plant in Quebec and 1 in Ontario were idle throughout 1934.

The value of sales from these rolling mills was reported at \$23,035,746, an increase of 66 per cent over the corresponding total of \$13,876,661 for 1933. Merchant bars were worth \$5,364,110; rails, \$3,660,274; blooms, billets and slabs, \$1,440,318; cold rolled and cold drawn shapes, \$1,152,885; bars for reinforcing concrete, \$1,138,554; structural shapes, \$1,104,324; wire rods, \$2,705,167; and railway tie plates, \$834,258. Plates, sheets, horseshoes, railway spikes, forgings and miscellaneous rolled products made up the remainder of the output.

About 831,000 long tons of iron and steel passed through the mills in 1934 and 775,000 tons of this came from the producers own works.

Imports of rolling mill products were valued at \$20,801,030 in 1934 compared with \$14,986,693 in 1933. Shipments from the United States were worth \$11,027,769 and the purchases from the United Kingdom were appraised at \$9,187,786.

Table 148.—Principal Statistics of the Primary Iron and Steel Industry, 1929-1934

Years	No. of plants	Capital employed	Average number of employees	Salaries and wages	(*) Cost of materials at works	(*) Selling value of products at works	Value added by manufacturing
		\$		\$	\$	\$	\$
1929.....	45	109,446,529	11,218	18,534,681	32,514,596	72,231,995	39,717,399
1930.....	49	112,079,926	9,723	14,934,325	22,765,648	52,588,935	29,823,287
1931.....	53	104,512,104	8,026	11,072,054	15,291,414	36,911,245	21,619,831
1932.....	52	96,323,629	4,847	6,131,057	6,289,483	16,197,526	9,908,043
1933.....	50	96,444,846	5,200	6,049,189	7,598,931	18,492,549	10,893,618
1934—							
Nova Scotia.....	6	18,973,518	1,297	1,609,354	3,179,177	6,701,638	3,522,461
Quebec.....	13	10,986,806	1,456	1,223,441	1,188,618	3,343,686	2,155,068
Ontario.....	22	57,803,304	4,306	5,832,583	8,087,469	18,037,559	9,950,090
Manitoba.....	4	1,676,263	283	286,361	179,048	708,900	529,852
Alberta and British Columbia.....	2 4	639,113	58	57,773	39,086	309,680	270,594
Canada.....	51	90,079,004	7,409	9,099,512	12,673,398	29,101,463	16,428,065

(*) Figures of materials used are of purchased materials only, and production figures cover sales only.

Table 149.—Production of Pig Iron and Sales by the Producers, 1933 and 1934

Grades	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Selling value at works
	Long tons	Long tons	Long tons	\$
1933				
Basic.....	189,428	151,976	15,648	272,600
Foundry.....	22,333	234	39,361	732,357
Malleable.....	15,556	2,029	21,498	397,966
Total.....	227,317	154,239	76,507	1,402,903
1934				
Basic.....	310,631	347,109	8,898	176,271
Foundry.....	50,923	1,596	54,422	1,023,474
Malleable.....	43,441	2,201	34,120	656,539
Total.....	404,995	350,906	97,440	1,856,284

Table 150.—Consumption of Pig Iron in Canada, by Industries and by Provinces.
1929-1933

	1929	1930	1931	1932	1933
	Long tons	Long tons	Long tons	Long tons	Long tons
(a) BY INDUSTRIES					
Steel ingots and castings.....	761,878	520,562	328,063	106,951	156,962
Castings and forgings.....	200,323	149,012	114,670	55,429	37,300
Boilers, tanks and engines.....	1,492	1,404	657	744	3,156
Agricultural implements.....	48,821	26,589	11,704	4,427	4,974
Machinery.....	32,483	24,836	8,837	4,913	4,091
Automobiles.....					
Automobile parts.....	3,823	2,718	35	1,823	2,000
Railway rolling stock.....	32,932	23,601	14,433	6,855	7,653
Wire and wire goods.....					
Sheet metal products.....	11,480	272	6		
Hardware and tools.....	2,504	1,713	1,130	908	872
Miscellaneous iron and steel.....	1,013	737	168	272	220
Electrical apparatus and supplies.....	4,982	2,862	1,585	546	427
Total.....	1,101,731	754,306	481,288	182,868	217,655
(b) BY PROVINCES					
Prince Edward Island.....	56	60	50	42	30
Nova Scotia.....	297,508	213,011	122,152	28,569	85,854
New Brunswick.....	2,258	1,677	1,287	689	971
Quebec.....	72,293	56,291	39,661	19,336	11,356
Ontario.....	712,242	478,284	315,221	132,181	117,934
Manitoba.....	11,549	2,761	1,415	1,274	822
Saskatchewan.....	2,000				
Alberta.....	1,094	187	120	108	73
British Columbia.....	2,731	2,035	1,382	669	615
Canada.....	1,101,731	754,306	481,288	182,868	217,655

Table 151.—Materials Charged to Iron Blast Furnaces, 1933 and 1934

Materials	1933		1934	
	Quantity	Cost at furnace	Quantity	Cost at furnace
Foreign iron ore..... long tons	400,290	\$ 1,378,198	718,237	\$ 2,513,465
Mill cinder, scale, etc..... long tons	17,992	57,343	37,043	78,139
Scrap (net charge)..... long tons	10,879	92,421	12,461	108,966
Limestone—				
From Canadian quarries..... short tons	21,888	28,477	69,318	84,675
From foreign sources..... short tons	110,347	140,501	139,786	155,587
Coke made in Canada—				
From Canadian coal..... short tons	135,323	803,659	155,085	879,223
From imported coal..... short tons	80,500	388,211	215,462	1,005,930
Imported coke..... short tons	32,151	164,378	44,915	285,941
Other materials..... short tons		63,052		48,233
Total.....		3,116,240		5,160,159

Table 152.—Blast Furnaces in Canada, 1934

Names of companies	Location of plants	Number of stacks	Total daily capacity (24 hours)	Number of days in blast	
				1933	1934
Dominion Steel and Coal Corporation Ltd..	Sydney, N.S.....	1	300		
		1	300		
		1	300		
		1	550	202	262
Total.....		4	1,450		
Canadian Furnace Co. Ltd.....	Port Colborne, Ont.....	1	350	181	205
The Steel Co. of Canada, Ltd.....	Hamilton, Ont.....	1	275	183	44
		1	550		278
Total.....		2	825		
Algoma Steel Corporation Ltd.....	Sault Ste. Marie, Ont...	1	300		
		1	300		
		1	450	84	203
		1	550		
Total.....		4	1,600		
Total for Canada.....		11	4,225		

Table 153.—Production of Ferro-Alloys, 1927-1934

Years	Long tons	Years	Long tons
1927.....	56,230	1931.....	46,764
1928.....	44,842	1932.....	16,161
1929.....	89,116	1933.....	30,133
1930.....	65,223	1934.....	29,940

Table 154.—Production of Steel Ingots and Direct Steel Castings, by Grades, 1927-1934

Years	Steel ingots		Direct steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Converter	Electric	
1927.....	868,440	134	17,569	2,191	19,611	907,945
1928.....	1,189,399	602	20,109	2,019	22,590	1,234,719
1929.....	1,295,162	14,444	35,806	2,590	30,022	1,378,024
1930.....	925,427	30,051	24,772	2,314	27,014	1,009,578
1931.....	612,437	25,017	14,760	590	19,305	672,109
1932.....	308,700	19,670	2,616	846	7,514	339,346
1933.....	378,666	15,393	5,017	288	10,615	409,979
1934.....	713,227	23,891	6,457	507	13,700	757,782

Table 155.—Materials Used in Steel Furnaces, 1933 and 1934

Materials	1933		1934	
	Quantity	Cost of purchased materials	Quantity	Cost of purchased materials
	Long tons	\$	Long tons	\$
(a) Metals:—				
Pig iron—Own make.....	154,827		349,137	
Purchased.....	2,135	46,450	3,209	65,216
Spiegeleisen and ferromanganese.....	4,157	208,046	6,771	345,683
Ferrosilicon.....	2,748	115,319	2,954	137,743
Other ferro-alloys.....	434	90,969	1,087	252,633
Scrap iron and steel—Own make.....	94,930		193,370	
Purchased.....	213,396	1,418,420	287,309	3,029,549
Metals for making alloy steel (nickel, etc.).....		95,604		71,141
Total metals.....		1,974,808		3,901,965
(b) Ores:—				
Crude iron ore—				
Foreign.....	17,740	121,010	33,739	197,087
Calcined, roasted, or treated ore—				
Foreign.....	80	928	220	3,644
Manganiferous ore—				
Foreign.....	198	3,203	751	12,235
Chrome, etc.—				
Foreign.....	133	2,564	134	3,892
Total ores.....	18,151	127,705	34,844	216,858
(c) General materials:—	Short tons		Short tons	
Limestone—				
Canadian.....	14,418	88,291	31,103	96,454
Foreign.....	20,114	27,567	46,712	51,026
Fluorspar.....	2,949	31,657	4,555	55,643
Dolomite.....	6,874	30,557	14,748	69,104
Magnesite.....	399	14,798	2,733	105,072
Coke made from Canadian coal.....	368	3,928	472	4,683
Coke made in Canada from imported coal.....	2,894	19,059	404	1,150
Imported coke.....	291	4,143	1,321	17,541
Anthracite coal.....	759	7,663	547	4,801
Bituminous coal.....	30	240	100	802
Charcoal.....	70	1,810	80	2,156
Electrodes.....		75,698		94,125
Moulding sands.....	8,960	56,607	14,199	73,424
Firebrick.....		34,694		49,386
Fireclay.....	2,904	25,365	3,005	26,393
Other materials.....		208,675		319,296
Total general materials.....		630,752		971,056
Total Value of Metals, Ores and General Materials used.....		2,733,265		5,089,879

Table 156.—Summary of Steel Furnace Capacity in Canada, 1934

Type of furnace	Number of furnaces (*)	Total daily capacity (24 hours)
Basic open hearth.....	42	(Long tons) 5,186
Electric.....	30	594
Converter.....	4	932
Total.....	76	6,712

(*) Including 2 furnaces (1 electric and 1 B.O.H.) which were idle in 1934.

Table 157.—Products Made in the Iron and Steel Rolling and Drawing Mills, and Sales by the Producers, 1933 and 1934

Products	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Value
	Long tons	Long tons	Long tons	\$
1933				
Blooms, billets and slabs (except for forging).....	187,372	177,998	8,691	259,334
Rails.....	67,835	120	69,052	2,899,750
Structural shapes.....	16,153	66	15,974	740,200
Merchant bars, including spring steel, alloy steel, tool steel, rounds, squares, flats (6 in. and under) except flats for cold rolling and bars for reinforcing concrete.....	56,474	6,949	56,667	3,241,735
Bars for reinforcing concrete.....	16,400	886	16,019	767,373
Wire rods, including chain rods.....	88,692	61,422	29,111	1,104,532
Nail, washer, spike and hinge plate.....	313	165		
Long angle splice bars, long fish plate bars, long tie plate bars and all other long rail joint shape bars.....	4,095	4,095		
Rolled blooms, billets and axle blanks for forging purposes only, excluding all intended for further rolling.....	1,497	354	1,159	69,457
Spike rods, bolt and nut rods, horseshoe bars, and all other miscellaneous rolled (not forged) forms, not elsewhere specified.....	7,038	5,173	1,834	111,325
Cold rolled and cold drawn steel shapes.....	8,049		8,028	729,324
Rail fastenings, finished—				
Tie plates.....	4,071	1	4,074	229,942
Angle splice bars and fish plates.....	808	1	1,075	76,667
Forgings of iron or steel.....	3,279		3,151	221,661
Railway spikes, pressed spikes.....	2,918	104	2,857	200,992
Washers.....	179	62	199	27,592
Scrap iron and steel.....	1,205	334	925	4,515
Other products, including plain sheets, plates, galvanized sheets, horseshoes, etc., which were made by only 1 or 2 concerns in this industry and for which figures cannot be shown separately.....				3,192,262
Total.....				13,876,661
1934				
Blooms, billets and slabs (except for forging).....	450,075	378,348	54,771	1,440,318
Rails.....	96,689	216	88,023	3,660,274
Structural shapes.....	23,070	560	23,258	1,104,324
Merchant bars, including spring steel, alloy steel, tool steel, rounds, squares, flats (6 in. and under) except flats for cold rolling and bars for reinforcing concrete.....	108,980	14,358	92,289	5,364,110
Bars for reinforcing concrete.....	24,279	1,776	24,083	1,138,554
Wire rods, including chain rods.....	175,585	99,089	76,992	2,705,167
Nail, washer, spike and hinge plate.....	630	602	1	91
Long angle splice bars, long fish plate bars, long tie plate bars and all other long rail joint shape bars.....	21,440	21,394		
Rolled blooms, billets, and axle blanks for forging purposes only, excluding all intended for further rolling.....	3,133	1,084	2,027	110,118
Spike rods, bolt and nut rods, horseshoe bars, and all other miscellaneous rolled (not forged) forms, not elsewhere specified.....	10,669	8,168	2,439	139,677
Cold rolled and cold drawn steel shapes.....	12,733		12,678	1,152,885
Rail fastenings, finished—				
Tie plates.....	16,003	3	16,482	834,258
Angle splice bars and fish plates.....	3,190	4	3,499	224,457
Forgings of iron or steel.....	4,178		3,848	300,383
Railway spikes, ship and drift spikes and pit spikes.....	5,283	221	5,197	365,915
Washers.....	450	105	392	53,835
Scrap iron and steel.....	1,571	561	1,218	9,708
Other products including plain sheets, plates, galvanized sheets, horseshoes, etc., which were made by only 1 or 2 concerns in this industry and for which figures cannot be shown separately.....				4,431,672
Total.....				23,035,746

Table 158.—World Production of Pig Iron and Ferro-Alloys, 1932-1934

(Supplied by *Imperial Institute*)
(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	3,574,000	4,136,000	5,969,100	Hungary.....	65,234	91,602	138,005
Union of S. Africa.....	14,272	26,000	(a)	Manchoukuo.....	362,366	426,676	458,311
Canada.....	160,291	257,450	434,935	Italy.....	487,192	557,966	571,571
India.....	913,314	1,057,837	1,320,210	Yugoslavia.....	9,815	29,238	32,097
Australia (b).....	190,132	336,246	487,259	Luxemburg.....	1,929,232	1,857,727	1,968,603
New Zealand.....		3,286	1,337	Netherlands.....	232,692	248,655	253,769
Total.....	4,900,000	5,800,000	8,300,000	Norway.....	101,464	110,873	124,927
FOREIGN COUNTRIES				Poland.....	195,536	300,956	375,946
Austria.....	92,974	86,560	131,384	Roumania.....	8,614	1,981	60,435
Belgium.....	2,705,327	2,667,623	2,905,889	U.S.S.R. (Russia).....	6,075,000	7,015,000	10,236,000
China.....	145,941	164,704	(a)	Spain.....	295,870	333,501	366,485
Czechoslovakia.....	442,997	491,099	590,843	Sweden.....	277,707	340,069	548,422
Finland.....	13,455	11,814	(a)	Mexico.....	20,059	26,100	(a)
France—				United States.....	8,781,453	13,345,602	16,138,573
Saar.....	1,328,180	1,566,586	1,796,831	Brazil.....	32,825	50,000	56,000
Other districts.....	5,450,004	6,224,340	6,053,761	Japan.....	1,020,304	1,433,866	1,744,383
Germany.....	3,870,258	5,163,645	8,579,070	Korea.....	161,068	161,348	207,478
				Philippine Islands.....	165	98	(a)
				Total.....	34,100,000	42,700,000	53,400,000
				World's Total.....	39,000,000	48,500,000	61,700,000

(a) Information not available.

(b) Years ended June 30.

Table 159.—World Production of Steel Ingots and Castings, 1932-1934

(Supplied by *Imperial Institute*)
(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	5,261,400	7,024,000	8,849,700	Italy.....	1,374,129	1,743,163	1,803,406
Union of South Africa (b).....	42,542	9,000	(a)	Latvia.....	336	1,336	2,076
Canada.....	339,346	409,979	757,782	Korea.....	(a)	(a)	58,755
India.....	569,810	694,073	797,569	Luxemburg.....	1,924,688	1,815,694	1,901,868
Australia (c).....	221,488	392,666	(a)	Poland.....	542,056	820,006	831,177
Total.....	6,400,000	8,500,000	11,000,000	U.S.S.R. (Russia).....	5,828,400	6,727,000	9,500,000
FOREIGN COUNTRIES				Spain.....	523,995	498,651	636,641
Austria.....	201,284	222,230	304,324	Sweden.....	519,935	619,913	848,176
Belgium.....	2,745,719	2,688,251	2,897,248	Mexico.....	57,215	75,000	(a)
Czechoslovakia.....	660,846	722,898	925,594	United States.....	13,681,162	23,232,347	(d)
France—							26,055,289
Saar.....	1,440,316	1,649,798	1,919,614	Japan.....	2,360,404	3,145,660	3,682,861
Other districts.....	5,550,957	6,427,754	6,076,662	China (estimated).....	30,000	30,000	30,000
Germany.....	5,535,254	7,335,832	11,510,831	Brazil.....	47,492	52,000	61,000
Hungary.....	177,000	224,067	310,000	Roumania.....	101,000	142,479	172,567
				Total.....	43,300,000	58,300,000	69,600,000
				World's Total.....	49,700,000	66,800,000	80,000,000

(a) Information not available.

(b) Including rails, fishplates, etc.

(c) Years ended June 30.

(d) Excluding steel castings which were produced by companies not manufacturing steel ingots.

LITHIUM

Lithium-bearing minerals occurring in the Pointe du Bois region of southeastern Manitoba have been investigated as to their economic value. A few years ago trial shipments of lepidolite and spodumene were made from the Silver Leaf mine located on the south side of Winnipeg river and considerable development work was conducted on the Buck property, Bernic lake. Some activity was reported at Bernic lake during July and August of 1934 by the Lithium Corporation of Canada, Ltd., however, no later developments were reported by this company up to the end of June, 1935. It was stated that the company plans the erection of a plant in Manitoba for the production of lithium salts and metal from ores of the Bernic lake deposits.

One of the chief consumers of lepidolite is the glass industry which employs the mineral in the production of heat-resistant products. Referring to lithium, "The Mining Journal," London, comments as follows:—"The therapeutic uses of certain lithium salts are very old, but the production to-day of other salts of this metal is already large, with promise of further expansion. Research work of an international character has resulted in a steady output of the metal (lightest of all metals) itself which is finding extensive employment, yet in quite minute proportions (a mere fraction of a per cent of the whole) in a bearing alloy, whilst a similar alloy has possibilities for employment as sheathing for cables. In short, the use of lithium is being steadily expanded in many directions, particularly in alloy form (calcium-lithium for instance) and the ground gained is not likely to be lost again. There would appear to be a wonderful future for this metal."

"Metallic lithium is now produced very efficiently by the electrolysis of fused lithium chloride, the product being 99.5 per cent pure. Lithium alloys are also capable of being deposited, lithium-calcium alloys being commercial materials. These lithium-calcium alloys find industrial application in giving graphite refinement and increased strength for cast iron, whilst lithium itself improves the machinability of stainless steel, and is usefully employed as a de-oxidizer for producing oxygen-free copper and as a hardener for lead alloys and aluminium-zinc alloys.... lithium hydride (LiH) is a product for which there is commercial possibilities. It reacts with water, evolving hydrogen, and as the gross weight of the hydride is much less than that of a steel cylinder housing an equal volume of gas, this particular product should become of importance as a portable source of hydrogen." (The Chemical Age, London).

By far the most important development of the year (1935) in connection with lithium, however, is the employment of lithium chloride solutions for air-conditioning. The highly concentrated lithium-solutions, after extracting moisture from the air, are evaporated and used over and over again.¹

No imports into Canada of lithium, lithium alloys or compounds, described as such, were recorded in 1934.

The annual world production of lithium metal is reported to amount to several thousand kilograms, valued at 165-175 marks per kilogram and "Mineral Industries" states that a monograph by H. Osborg (electrochemical society, New York, 1935) gives a detailed discussion of the metal, its properties, occurrence in nature, recovery and uses.

"Metal and Mineral Markets—New York" quotations, September, 1935, for metallic lithium per pound, 98 to 99 per cent, 100 pound lots, \$15. Lepidolite—per ton, \$20 to \$25 for ordinary grades. Amblygonite—per ton, f.o.b. mines, 8 to 9 per cent Li_2O , \$34 to \$35.

MAGNESIUM

Metallic magnesium is not produced in Canada. "Magnesium has only a short history as an industrial metal. Its present production is estimated at 30,000 to 35,000 tons yearly, but is expected to increase. Possible raw material for its production is exceedingly abundant; it includes magnesium chloride (natural brines) and the natural carbonates, magnesite and dolomite. Magnesium is obtained by several processes, but in all these on the principle of reducing the chloride or oxide electrolytically from a bath containing these materials in a suitable molten flux, which is generally a fusible halogen salt. Unalloyed magnesium metal, as such, has little industrial importance, but in the form of its alloys in which it is the basic metal, it is an exceedingly useful material combining reasonable strength and good working properties with small weight. The best known alloys are the series under the general name "Elektron" which have numerous uses, including the manufacture of pistons for internal combustion motors and motor bodies. If its price can be lowered this will be a serious competitor with aluminium in different employment spheres; although somewhat inferior in strength, its considerable smaller weight favours its use in aircraft construction. Besides alloys in which magnesium is the basic metal, there are others in which it is used in small percentage to great advantage. These alloys include some of aluminium in which the magnesium plays an important part, although present in small quantities. The best known examples of these are duralumin and magnalium." (The Mining Journal, London).

(¹) Paul M. Tyler, A.I.M.E.

The United States Bureau of Mines reports that in 1934 the quantity of magnesium ingot sold or used in the United States was 4,249,838 pounds, an increase of 196 per cent over 1933 and the entire domestic output of primary magnesium was obtained from magnesium chloride recovered as a joint product of the salt wells of the Dow Chemical Company near Midland, Michigan. The metal magnesium is not yet produced in Canada.

The same prices were quoted by trade journals on ingot (4 x 16 inches) throughout 1934 as in 1933 and 1932—30 cents a pound in carloads, and 32 cents a pound in 100 pound lots or more, L.C.L.

MANGANESE

No Canadian manganese ores have been commercially shipped or sold in Canada since 1931. The Department of Mines, Ottawa, reports that the manganese ores mined in Eastern Canada are pyrolusite, manganite, psilomelane and bog manganese. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were obtained mainly from New Ross in Lunenburg county, Loch Lomond, Cape Breton, and Aylestord, Kings County, all in Nova Scotia; in New Brunswick, at Dawson Settlement and Turtle Creek, Albert county, and from Markhamville, King's county. Manganiferous ores have also been mined in British Columbia.

In 1934 some development work was reported on a bog manganese deposit located at North Renous, New Brunswick, and a trial shipment of the material may be made in 1935. Considerable work was also done on manganese bearing veins occurring near the village of Elgin, Albert county.

Manganese is utilized largely in the manufacture of various steels and the consumption fluctuates with the world's steel output; minor quantities are used in the non-ferrous alloys, chemical and electrical products industries.

Imports of manganese oxide into Canada during 1934 totalled 619,069 cwt. valued at \$234,236 as compared with 686,842 cwt. worth \$293,910 in 1933; the greater part of the imports in both years came from the Gold Coast while lesser quantities were obtained from the United States, British South Africa, and the United Kingdom. Imports of ferro-manganese and silico-manganese, containing more than 30 per cent by weight of manganese totalled 6,903 cwt. valued at \$61,017 in 1934 as compared with 4,835 cwt. worth \$31,611 in 1933. (To April 18th, 1934).

"Metal and Mineral Markets" quotations, September, 1935, were: manganese ore, per long ton unit of Mn., c.i.f. North Atlantic ports, cargo lots, exclusive of duty; Brazilian, 46 to 48 per cent Mn. 24 cents; Chilean, 47 per cent minimum, 25 cents; Indian, 48 to 50 per cent, 25 cents; Caucasian, 52 to 55 per cent, 26 cents; South African, 49 to 51 per cent, 26 cents.

Table 160.—Production of Manganese Ore in Canada, 1923-1934

Year	Tons	Value
		\$
1923.....	200	1,400
1924.....	584	4,088
1925-29.....		
1930.....	273	1,355
1931.....	117	2,893
1932-34.....		

NOTE.—For years 1886 to 1922 see previous reports.

Table 161.—World Production of Manganese Ore, 1932-1934

(Supplied by Imperial Institute)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Gold Coast.....	(b) 50,689	(b) 265,140	365,178	U.S.S.R. (Russia).....	813,000	982,000	1,792,000
Northern Rhodesia.....		5,367	2,041	Spain.....	2,550	2,789	3,736
Union of South Africa.....		20,894	50,229	Sweden.....	4,653	6,124	6,212
India.....	212,604	218,307	406,306	Egypt.....	322	184	944
Unfederated Malay States..	9,278	13,194	18,649	Morocco (French zone)....	4,000	4,752	7,161
Australia.....	106	149	105	Portuguese India.....	3,517	1,600	(a)
Total.....	270,000	520,000	840,000	Cuba.....	2,113	89,224	(a)
FOREIGN COUNTRIES				Puerto Rico (exports)....	2,302	1,638	1,711
Austria (b).....	(a)	(a)	(a)	Mexico.....	301	564	654
Czechoslovakia.....	32,951	16,799	58,433	United States (c).....	17,777	19,146	26,514
Germany.....	12	554	507	Argentina.....	248	404	(a)
Greece.....	733	1,578	(a)	Brazil.....	36,152	24,500	2,300
Hungary.....	1,473	6,134	10	Chile.....	441	450	(a)
Italy.....	387	4,453	6,831	China.....	21,200	9,300	(a)
Yugoslavia.....	157	521	1,086	Japan.....	25,828	42,847	56,262
Roumania.....	4,971	2,730	11,198	Netherlands, East Indies..	8,156	10,238	11,451
Manchoukuo.....	59	740	(a)	Turkey.....	2,800	7,600	2,645
Portugal.....		25	290	Total.....	980,000	1,240,000	2,080,000
				World's Total.....	1,250,000	1,760,000	2,920,000

(a) Information not available.

(b) Exports.

(c) Shipments, excluding ore containing 10 to under 35 per cent mn, which is included with iron ore as follows:—

1932.....	15,635 long tons.
1933.....	12,779 "
1934.....	23,231 "

MERCURY

There has been no Canadian production of new mercury reported since 1897. Previous to this a small output of quicksilver was recorded as having been produced in British Columbia from a property situated on the north shore of Kamloops lake. The principal mercury producing countries are Italy, Spain, United States, Mexico, and Czechoslovakia.

The 1934 Minerals Year Book of the United States Bureau of Mines refers to the following new uses for mercury: A new type of mercury lamp using a small quantity of rubidium, and closely approximating sunlight has been developed; Dupont Lignason is an organic mercurial used to prevent fungus growth on freshly cut lumber in storage.

In the United States, during 1928, drugs and chemicals accounted for about 39 per cent of the mercury consumed and fulminate used in detonators and ammunition for 19 per cent. Next in importance was the use of mercury for scientific instruments and electrical apparatus followed in turn by vermilion, felt, and caustic soda and glacial acetic acid. This order of importance has probably remained substantially the same since that year, if the large amount of mercury used in 1932 for mercury-boiler plants is not considered, although the proportionate use for electrical apparatus may have increased somewhat. In Canada a considerable amount of mercury is utilized in the amalgamating of gold in ores.

It was reported in the Japanese Press early in 1935 that an extensive deposit of mercury ore had been discovered in Hokkaido, on the Teshio river. The deposits are estimated to contain about three million tons of mercury metal.

Imports of mercury into Canada in 1934 totalled 246,892 pounds valued at \$183,366 as compared with 49,066 pounds worth \$35,057 in 1933. Of the 1934 imports 146,879 pounds came from Italy and 83,809 pounds from the United States. Imports of mercury salts in 1934 were appraised at \$3,010 as against \$1,676 in 1933.

Quicksilver was quoted, September, 1935, New York, \$69.50 to \$71.50 per flask of 76 pounds; London, £11 6s. to £11 7s. 6d. for spot.

Table 162.—Imports into Canada of Mercury, 1926-1934

Year	Pounds	Value
		\$
1926.....	100,492	84,910
1927.....	124,099	160,330
1928.....	199,603	269,746
1929.....	346,701	478,048
1930.....	105,755	153,837
1931.....	21,159	25,454
1932.....	43,230	37,068
1933.....	49,066	35,057
1934.....	246,892	183,366

Table 163.—World Production of Mercury, 1932-1934

(Supplied by Imperial Institute)

(Pounds)

Country	1932	1933	1934
BRITISH EMPIRE			
Australia (concentrates).....	1,989	47	167
New Zealand.....	1,500	7,500	3,852
FOREIGN COUNTRIES			
Austria.....	2,200	440	
Czechoslovakia.....	99,329	14,872	58,052
Italy.....	2,240,518	1,338,058	972,238
Spain.....	1,797,978	1,491,601	2,416,729
Algeria.....	90,041		
Mexico.....	557,176	346,372	348,161
United States.....	959,272	734,844	1,173,820
Turkey.....		1,748	8,192
Japan.....	5,256	17,807	14,930
China.....	44,000	33,000	(a)
Korea.....	2,050	(a)	(a)
Roumania.....	168	600	(a)
Bolivia (exports).....	38,383		50,384
World's Total (b).....	5,800,000	4,000,000	(a)

(a) Information not available.

(b) Excluding U.S.S.R. (Russia).

MOLYBDENITE

No commercial mine shipments of molybdenite ore or concentrates have been made in Canada since 1931 in which year 1,222 pounds of molybdenite concentrates were shipped from a property in Ontario. The mineral occurs in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia, and deposits in Ontario and Quebec have yielded a considerable output during past years. The mine of the Phoenix Molybdenite Corporation, Ltd., located in Bagot township, Renfrew county, Ontario, was operated from April to October, 1934; the mill of the company went into operation on August 15 and treated about 200 tons of surface ore, with a recovery of 3,300 pounds of concentrates.

It was reported in 1934 that an adit had been commenced on the Stella molybdenite property located some 5 miles southwest of Endako in the Omineca division, British Columbia. Molybdenite occurs here in fine scales, remarkably free from other sulphides, in quartz veins up to 2 feet wide in granodiorite and also as disseminations in the rock adjacent to the veins. No report of ore shipments from this property was received in 1934.

In 1933, 700 pounds of hand picked molybdenum ore were shipped from a molybdenite prospect at Pigeon Lake, Gloucester county, New Brunswick. This was for experimental purposes.

In Preissac township, Abitibi county, Quebec, the Height of Land Company during 1934 dewatered two old shafts and the underground workings of its molybdenite property; the company also conducted some prospecting and completed a small amount of diamond drilling. No shipments of ore were made.

The United States is by far the world's greatest producer of molybdenite ores and in 1934, as in other recent years, the Climax Molybdenum Company at Climax, Lake County, Colorado, and the Molybdenum Corporation of America near Ouesta, Taos county, New Mexico, were the principal producers and shippers.

The world production of molybdenum in 1934 was estimated by the Mining Journal, London, at 10,175,000 pounds, of which 700,000 pounds came from Green Cananea (Mexico), 300,000 pounds from Norway (Knaben mine), 150,000 pounds from Morocco and the balance from the United States. The Journal states that "there has been a very large development in Germany in the use of molybdenum salts for catalysers for hydrogenation work. There are other uses in connection with the oil industry now being developed which may also largely increase the demand for molybdenum. Experience in the United States indicates that molybdenum is substantially replacing tungsten in modern alloy steel. One of the advantages of molybdenite alloys is that molybdenum steel can be made much thinner for equal strength with consequent marked saving in weight; this is particularly important in the case of aeroplanes and the new streamline trains. Large quantities of bearing metal are now being made containing percentages of molybdenum. Molybdenum has a wide range of use in connection with various types of stainless steel, and in the development of cast iron alloys." In the incandescent lamp and radio tube industries the metal is used in the form of wire and sheet; it is also employed in the manufacture of high temperature electric furnaces.

Imports of calcium molybdate into Canada, when imported by manufacturers of steel for use exclusively in the manufacture of steel, in their own factories, totalled 35,187 pounds valued at \$15,586 in 1934 as compared with 7,082 pounds worth \$3,414 in 1933.

"Metal and Mineral Markets," New York, September, 1935, quotations were: Molybdenum, per pound, in 10 to 49 pound lots, C.P. powder, \$9.50; 97 per cent, \$4.10. Molybdenum ore, per pound of contained MoS_2 , nominally 42 cents for 75 to 85 per cent concentrate. London, per long ton unit, nominal at 33s. for 80 to 85 per cent concentrate.

Table 164.—Production of Molybdenite in Canada, 1924-1934

Year	Ores mined	Ores treated	Ores and concentrates shipped		MoS ₂ content of shipments	MoS ₂ production (probable recovery)	
	Tons	Tons	Tons	Value (a)	Pounds	Pounds	Value (b)
1924	700	668	10.0	\$ 9,370	18,739	18,739	\$ 9,307
1925	3,000	2,779	15.3	11,176	22,350	22,350	11,176
1926	4,186	4,490	12.6	10,472	20,943	20,943	10,472
1927							
1928							
1929	9,100	2,900	9.5	6,400	16,150	16,150	6,400
1930							
1931	12	12	0.61	280	1,222	1,222	280
1932-1934*							

(a) Value as given by the operators. (b) Estimated at the average market value of molybdenite.

Note.—For years 1902 to 1923 see previous reports.

*It was reported that 200 tons of surface ore was milled during 1934 at a molybdenite property in Renfrew County, Ontario; no shipments were reported.

Table 165.—World Production of Molybdenum Ore, 1932-1934

(Supplied by Imperial Institute)

(In cwt.—112 pounds of concentrates)

Country	1932	1933	1934
BRITISH EMPIRE			
Australia	102	130	89
FOREIGN COUNTRIES			
Norway (MoS ₂ content)	5,181	8,149	4,793
French Morocco (MoS ₂ content)		3,700	2,700
United States (MoS ₂ content)	36,176	84,554	139,315
Korea	879	2,070	2,037
Peru (MoS ₂ content)	150	198	176
Mexico	103	1,303	15,315
Japan			99

RADIUM-URANIUM (Pitchblende-Silver)

The commercial production of primary radium and uranium products in Canada comes entirely from the refinery of Eldorado Gold Mines, Ltd.; this plant, located at Port Hope, Ontario, was in continuous operation throughout 1934. Ores and concentrates treated at Port Hope are shipped from the company's pitchblende-silver mine situated at Echo Bay, Great Bear Lake, Northwest Territories. In summer months, roughly from July to October, transportation is by water route from the railhead at Waterways, Northern Alberta, via Athabaska river, Lake Athabaska, Great Slave River, Great Slave Lake, Mackenzie River, and Great Bear River to Great Bear Lake, a total distance of 1,400 miles. In both summer and winter regular airplane service is maintained between Edmonton and Waterways, Alberta, and Great Bear Lake.

During 1934 the Port Hope plant received from the mine 77 tons of pitchblende and silver ore and seven tons of silver concentrates. Twenty-six tons of ore were treated with the recovery of radium, uranium, silver and lead; the value of these products was reported, by the press, at \$210,000.

The eighth annual report of the Company gives, for the first time, an estimate of ore reserves. It is stated that, assuming the ore is continuous from the surface to the 125 foot level, the two ore bodies indicated in drifting contain ore to the value of \$2,400,000. This estimate was based on the prevailing market prices for radium, uranium products and silver. No allowance is made for ore below the 125 foot level.

The Consolidated Mining and Smelting Company of Canada, Ltd., reports that underground development was continued on its Echo Bay property, with somewhat favourable results. Altogether 524 feet of drifting and crosscutting was accomplished. The main crosscut intersected a vein not previously located on the surface but parallel in strike to number two vein, which carried fair values in silver for 85 feet, with some sections of high grade composed of leaves, wires and plates of silver. No pitchblende ore was encountered and no shipments of silver ore made.

Both surface and underground operations were carried on during 1934 by Bear Exploration and Radium Ltd.; the property of this company is located at Cameron Bay, Great Bear Lake, and a test shipment of three tons of silver ore was made in 1934 to the Trail smelter, British Columbia. Other operations in the area included those of Great Bear Lake Mines Ltd.; this company conducted shaft sinking, crosscutting and drifting, but reported no shipments of ore.

In Ontario the Canada Radium Mines, Ltd., maintained steady surface and underground development work at its radium bearing deposit located at Cheddar, Haliburton county. The shaft has been sunk to a depth of 375 feet with levels at 125, 250 and 365 feet. Approximately 700 feet of lateral work has been completed. No ore shipments were reported by this company.

In order to permit sale the National Research Council, Ottawa, recently conducted tests for the standardization and certification of the radium products of the Eldorado Gold Mines, Ltd. Tests demonstrated the value of the material, no significant impurities were discovered and needles of radium were tested and certified. Work is also being conducted by the Council to determine the life of radium luminous compounds as used in watches, clocks and aircraft instruments.

The U.S.S.R. Chamber of Commerce, Moscow, reports that an expedition party of the Moscow Institute of Rare Metals, which has been working at Cheleken Island, has worked out a process for obtaining radium salts from bore hole waters. Work has been started in connection with the construction of a test plant for obtaining radium concentrate from water. The discovery has been reported by Soviet geologists of a large deposit of uranium in the Caucasus which is said to carry 3 per cent U_3O_8 and to be larger than Tyuya Muyun and Taboshar. The ores are believed to resemble the carnotite ores of the United States.

The last annual report of the Union Minière du Haut-Katanga states that the radium market was improved and the quantity of its sales was very satisfactory in 1934.

It was also reported in 1934 that "very extensive deposits" of autunite (calcium uranium phosphate) were discovered near the village of Streltscha, Bulgaria, and that efforts were being made in Australia to develop the uranium deposits on Mt. Paintec located in the desert north of the railroad to Broken Hill.

The greater part of the world's radium supply is utilized for therapeutic purposes whereas uranium, in the form of salts, is used largely for colouring glazes in the ceramic industry.

Imports of radium into Canada in 1934 were valued at \$211,140 as compared with \$8,374 in 1933.

"Metal and Mineral Markets" quotations, September, 1935, for radium was \$50 per Mg. radium content. New York quotation, September for uranium oxide, kegs, was \$1.50 per pound up.

Table 166.—World Production of Uranium Minerals, 1932-1934

(Supplied by Imperial Institute)

(Cwt. 112 pounds)

Country	1932	1933	1934
BRITISH EMPIRE			
Canada.....	(b)	(b)	(b)
FOREIGN COUNTRIES			
Czechoslovakia (U ₃ O ₈).....	376	236	236
Portugal.....	645	1,233	791
United States (U ₃ O ₈).....	34	18	70
Belgian Congo.....	(c)	(c)	(c)

Uranium minerals are also produced in Russia. The production recorded in 1927 was about 50 tons; later information is not available.

(a) Information not available.

(b) During 1933 and 1934, 3,021 mgrms. and 3,000 mgrms. of radium of 98 per cent average concentration and 34,940 lb. and 27,000 lb. of uranium salts were produced respectively.

(c) The output of uranium minerals is not available for these years but it is reported that the radium produced from these ores amounted to 6 and 6.7 grams 1932 and 1933 respectively. This production of radium represents the greater part of the world's supplies.

SELENIUM

Production of selenium in Canada in 1934 totalled 104,924 pounds valued at \$171,311 as compared with 48,221 pounds worth \$70,345 in 1933. The production of the metal in Canada represents a by-product in the refining of blister or anode copper in electrolytic copper refineries located at Montreal East, Quebec, and Copper Cliff, Ontario. Selenium was produced commercially for the first time in Canada in 1931, the metal being recovered at Copper Cliff by the Ontario Refining Company, Ltd. Selenium produced in Canada is credited to the provinces from whose ores the blister copper, electrolytically refined, was obtained.

Selenium has found its best use as a decolorizer and as a base for various colours in the manufacture of glass. It is used in the rubber industry for compounding to increase tensile strength, resistance to abrasion and to shorten the cure. The metal is also employed in the manufacture of photo-electric cells and stainless steels. It has also been used effectively as an insecticide for the elimination of the red spider in fruit orchards. Selenium-cadmium yellow glasses are being employed now for marine and aviation beacons and for automobile headlights.

"Metal and Mineral Markets," September, 1935, quotation for selenium was—per pound, \$2 for black powdered, 99.5 per cent pure.

Table 167.—Production of Selenium in Canada, 1931-1934

Year	Pounds	\$
1931.....	21,500	40,850
1932.....	48,221	70,345
1933.....	104,924	171,311
1934.....		

SODIUM

Large quantities of sodium are used in oil refining and in various chemical industries involving organic syntheses. Its employment has reached a point where it is shipped in 40 ton tank cars. These cars, recently described, are equipped with steel coils welded on the outside in which cold oil is circulated while the molten metal is run in, and hot oil when remelting for unloading. For deoxidizing brasses and other non-ferrous alloys in which a content of 2 per cent or more metallic zinc may be tolerated, a sodium-zinc alloy, containing 2 per cent sodium, has been developed. Addition of this new alloy to brasses generally tends to improve the physical properties.¹

(1) Paul M. Tyler, A.I.M.E.

TANTALUM AND COLUMBIUM

Tantalite, the principal ore of tantalum, has been produced chiefly in the Pilbarra field of Western Australia, occasional small shipments of the mineral have also been made from the United States, Africa and British India. It is stated that the mineral tantalite and columbite have been identified in deposits occurring in Renfrew county, Ontario. The United States Bureau of Mines reports that Fansteel Products Co. Inc., North Chicago, Ill., is the leading producer of tantalum metal and since 1922 has been supplying not only the United States but most of the tantalum used in Europe, although the Siemens concern in Germany has refined a portion of its requirements, and Blackwell's Ltd., in Liverpool, has been producing ferrotantalum containing columbium for fifteen years and more. Fansteel is also the only commercial supplier of columbium in the world, but the Electro Metallurgical Company of Niagara Falls, N.Y., recently engaged in commercial production of ferrocolumbium.

Tantalum is reported as being sold extensively for rayon spinnerets and various kinds of chemical plant vessels and equipment. Seamless tantalum tubes are made in several sizes down to small-bore tubing for hypodermic needles. Columbium has a low work-function and consequently is being used as an emitter in extra-high-power electronic tubes now being produced more or less experimentally by several European companies. The use of ferrocolumbium in stainless as well as plain chrome steels is fast becoming an established fact, and a certain amount of ferrotantalum seems to be used in steels in Europe. The melting point of tantalum carbide is given as $3,875^{\circ}\text{C}.$, which is above the temperature of the carbon arc $3,500^{\circ}\text{C}.$ and higher than that of any other known compound except, perhaps, hafnium carbide. High resistance to corrosion attack is also cited as contributing to the ability of tantalum carbide tool mixtures to cut steel of previous unmachinable hardness. Nominal quotations for tantalum metal, rod or sheet, after remaining at a base sheet price of \$130 a kilogram gross since the end of 1930, were advanced to \$143 in March, 1934. Tantalum ores, of 60 per cent Ta_2O_5 grade, were quoted variously at 75 cents to \$2.50 per pound of Ta_2O_5 contained, according to source. Ferrocolumbium, after selling for some time at \$2 was later advanced to \$3 a pound.¹

TELLURIUM

The first commercial production of tellurium in Canada occurred in 1934, the metal being recovered at the electrolytic copper refinery of the Ontario Copper Refining Company, Ltd. The output totalled 5,130 pounds valued at \$25,599.

Tellurium is used as a hardening and strengthening agent in lead and its alloys. Tellurium lead, with 0.02 to 0.1 per cent tellurium is reported to be remarkably strong and corrosion resisting as compared with pure lead. The metal is also employed in the manufacture of rubber products, its function being to increase tensile strength and resistance to abrasion.

It was recently reported that a successful method of plating rhenium had been evolved; the coating is very hard and possesses a high resistance to hydrochloric acid. The metal occurs in certain copper refinery slimes.

In May, 1935, it was reported that tellurium was being produced in Russia as a by-product in the treatment of the copper ores from Kyshtym. The world's largest tellurium producer is probably the United States, however European metallurgical plants are showing an increased interest in tellurium recovery.

New York quotation for tellurium, September, 1935, was \$2 per pound.

TIN

Tin ores are not mined in Canada. The metal is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in Southeastern Manitoba. It has also been reported at New Ross, Nova Scotia.

The Mining Journal, London, states that most of the tin available for smelting at the present time is alluvial, comprising nearly all the production of Malaya, Netherlands Indies, Nigeria.

(¹) United States Bureau of Mines.

Siam, the Congo, and considerable proportions of the output from Burma, Indo China, and some of that from South and East Africa and Australia. The rapid development of the tin deposits of the Congo is bringing tin smelting in Belgium and the Congo into prominence.

E. Baliol Scott, in the "Mineral Industry," says: "The longer the international policy of compulsory restriction continues, the larger part it plays in the fortunes of the industry. Such is the experience of all experiments in international cartelisation, and to-day the International Tin Committee with its Siamese twin, the Buffer Stock Committee, is about the only matter of real interest. The price structure at the high levels now ruling depends upon the amount of tin which the committee permits to be produced and marketed, and on the outlook for price largely depends what fresh development and equipment of known deposits is put in hand—the international agreement was for three years from January 1, 1934, to be extended for a further period or periods, if the four signatory governments and Siam so decide.

Table 168.—Available Statistics on the Consumption of Tin in Specified Canadian Manufacturing Industries, 1933-1934

Industries	Items (used)	1933	1934
		Pounds	Pounds
Brass and copper products.....	{Ingots.....	125,526	261,354
	{Scraps.....	3,568	91,939
	{Other.....	19,339	5,038
White metal alloys.....	Pig.....	2,086,320	2,455,847
Iron and steel.....	Tin.....	631,136	1,214,493
Grand Total.....		2,865,989	4,023,671

Table 169.—Imports into Canada of Tin, 1932-1934

	1932		1933		1934	
	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
Tin in blocks, pigs and bars.....	3,148,400	809,437	2,834,100	1,149,378	3,999,900	2,053,773
Tin foil.....	6,749	3,293	8,271	4,076	35,158	18,990
Strip waste.....	1,884,000	6,850	3,416,000	11,310	1,426,000	6,999
Collapsible tubes.....		67,810		81,258		38,597
Tin plated kitchen and dairy hollow-ware not painted or decorated.....		72,445		39,355		41,463
Manufactures of tin plate, painted, japanned, decorated or not, and manufactures of tin, n.o.p.....		723,511		437,982		386,232
Tin cans and containers for food.....		126,418		138,297		186,175
Containers manufactured from tin plate, n.o.p.*.....				165,509		239,497
Bichloride of tin or tin crystals.....	1,185,483	189,128	826,632	149,880	333,311	88,327
Phosphor tin and phosphor bronze in blocks, etc.....	319,064	78,749	506,464	135,997	826,611	232,483
Oxide of tin and copper.....	†47,459	12,532	144,657	50,743	207,769	86,376
Sheets, plates, hoop, band or strip, coated with tin, n.o.p.....	79,967,400	3,146,162	149,713,800	6,549,512	159,429,000	7,319,878
Total.....		5,238,335		8,913,297		10,698,790

*From April 1, 1933. †From October 12, 1932.

Table 170.—World Production of Tin Ore

(Supplied by *Imperial Institute*—London)

(In terms of metal)

(Long tons)

Producing country	1932	1933	1934
BRITISH EMPIRE			
United Kingdom.....	1,337	1,542	1,999
Nigeria.....	4,320	3,755	5,000
Southern Rhodesia.....	4	11	11
South West Africa.....	65	144	136
Swaziland.....	59	71	114
Tanganyika Territory.....	50	59	103
Uganda.....	261	272	334
Union of South Africa.....	540	539	570
India.....	3,168	3,472	4,061
Federated Malay States (shipments).....	28,363	23,922	36,385
Unfederated Malay States.....	1,341	923	1,343
Straits Settlements.....	38	57	49
Australia.....	2,138	2,810	2,986
Total.....	41,700	37,600	53,100
FOREIGN COUNTRIES			
Argentina.....		45	254
Portugal (estimated).....	400	500	530
Spain.....	78	70	102
Belgian Congo.....	689	1,950	4,356
Cameroon (French).....		60	150
Morocco (French).....		40	40
Mexico.....	740	123	16
United States.....	(8 cwt.) 3		8
Bolivia.....	21,100	17,000 (b)	22,638
China.....	7,572	7,961	8,000
French Indo-China.....	1,000	1,038	1,134
Japan.....	1,557	1,538	1,821
Netherlands East Indies.....	16,789	12,609	19,433
Siam.....	9,276	10,300	10,157
Total.....	59,000	53,000	68,000
World's Total.....	101,000	91,000	121,000

NOTE.—The metal content of the ores has been calculated on the following percentages—South West Africa 70, Swaziland 70, Uganda 70, India 70, Belgian Congo 70, Japan 70, Siam 72.

(a) Information not available.

(b) Exports.

TITANIUM ORE

Important deposits of ilmenite, some of which contain rutile, occur near Baie St. Paul, Quebec, and titaniferous ores have been exported from this area for some years. Shipments of these ores in Canada during 1934 totalled 2,023 tons valued at \$14,161, the entire output coming from properties in the province of Quebec. Shipments during the first six months of 1935 amounted to 2,419 tons worth \$16,933.

“Like molybdenum, titanium has also found its way into cast iron and stainless alloys, although on a much more modest scale. It is added to cast iron to make strong alloy compositions more easily to machine, to close the pores and reduce the size of the graphite flakes. Added to stainless steel in a ratio of 5 to 7 times the carbon content, it serves to inhibit inter granular corrosion. It also prevents air-hardening and imparts ductility and softness to the steel. Otherwise, the most important metallurgical use of titanium is as a scavenger to remove oxygen and nitrogen from iron and steel. Alloyed with copper, titanium imparts age-hardening properties; the carbide is also being used in cutting steels. The output of titanium oxide, an excellent white pigment (possessing high hiding powers) is, however, much more important than that of the metal.” (Engineering and Mining Journal).

The United States Bureau of Mines defines the standard titanium-calcium pigment as containing 30 per cent titanium dioxide precipitated upon and coalesced with calcium sulphate, and the titanium-barium pigment as containing 25 per cent titanium dioxide precipitated upon a blanc fixé base. A leading brand of titanated lithopone contains 15 per cent titanium dioxide. The Titanium Pigment Co. (subsidiary of the National Lead Co.) made several improvements in

its St. Louis factory and was constructing a large new plant at eastern seaboard, the site finally selected being at Sayreville, N.J. This new plant is reputed to cost \$4,300,000. Titanium dioxide has other uses than in paints and paper fillers. Recently, it has been advocated for use in vanishing creams and allied toilet preparations and for reducing the luster of rayon (Dreyfus process), as well as more extensively in enamels and sundry other ceramic products.

Imports into Canada of antimony oxide and titanium white from April 1st to December 31st, 1934, totalled 983,539 pounds valued at \$131,005.

September, 1935, quotations—New York—titanium metal, 96 to 98 per cent, \$6 to \$7 per pound; titanium ore—per gross ton, ilmenite, 45 to 52 per cent TiO_2 , f.o.b. Atlantic seaboard, \$10 to \$12, according to grade and impurities. Rutile, per pound, guaranteed minimum 94 per cent concentrate, 10 cents.

Table 171.—Consumption of Titanium White in Canadian Paint Industry, 1931-1934

	Pounds	Cost at Works
1931.....		\$
1932.....	745,207	89,761
1933.....	691,304	96,759
1934.....	1,061,249	128,969
	1,710,188	186,678

Table 172.—World Production of Titanium Minerals

(Supplied by *Imperial Institute*, London)

(Long tons)

Producing country and description	1932	1933	1934
BRITISH EMPIRE			
Canada (shipments)—Titaniferous iron ore.....			1,806
India—Ilmenite.....	50,053	43,384	75,644
Australia—Ilmenite.....		550	51
FOREIGN COUNTRIES			
Norway—Ilmenite.....	13,268	22,846	25,891
Rutile.....	30	55	243
Portugal—Ilmenite.....			434
Egypt.....	479		161
Senegal (exports)—Ilmenite.....		300	500
Argentina—Titaniferous iron ore.....		2,559	(a)
Brazil (exports)—Ilmenite.....	34	95	114

NOTE.—Titanium minerals are also produced in the United States, but figures are not available for publication. In recent years, however, the production of ilmenite has been in the order of 1,000 to 5,000 tons, and that of rutile has been several hundred tons.

(a) Information not available.

TUNGSTEN

Tungsten minerals have been found in widely separated districts in Canada. Deposits in Nova Scotia and New Brunswick appear to possess the greatest economic possibilities. Comparatively small shipments of tungsten ores were made in Canada in 1912 and 1917; no commercial production has been reported since the latter year.

At Indian Path, Lunenburg county, Nova Scotia, the Indian Path Mines, Ltd., carried on work during the winter months of 1934. Number 2 shaft was deepened 80 feet and at 70 a feet level was driven east a distance of 40 feet along No. 1 vein which consists of quartz containing small segregations of scheelite, also crystals of galena, arsenopyrite and pyrites. At the east end of the level a crosscut was driven to connect with No. 3 shaft. This crosscut intersected two scheelite bearing quartz veins. No ore shipments were reported from the property.

The British Columbia Department of Mines reported that for the first time in many years, interest was evinced in tungsten properties, at one of which, the Hardscrabble mine near Barker-ville, preliminary investigation was commenced.

Tungsten has a number of industrial uses, being employed in the manufacture of high temperature electric furnaces, vacuum tube filaments, incandescent lamp filaments, electric contact surfaces and laboratory equipment. It is an important alloying element in such high speed tool alloys as stellite and is a constituent in certain resistance welding electrodes and hard cemented carbides.

"Broadly speaking, it may be taken that for normal consumption with trade in a reasonable state of activity, the world's requirements must be some 12,000 to 14,000 tons of mineral concentrates, equivalent to half this quantity of metal. The chief producers in 1913 were India and Burma, United States and Portugal. To-day the chief output available is from China which has shipped, and probably under normal conditions, can produce comfortably 6,000 tons a year. Chinese government manipulation of the market, and some improvement in demand, have caused prices to remain high for some time, and, in consequence, numerous sources of supply outside China have been developed on a larger scale. The countries producing the bulk of the world's requirements to-day, are: China, Burma, Malaya, Bolivia, United States and Portugal, while Australia, Argentine, Cornwall and several other countries have contributed substantial quantities." (The Mining Journal, London).

Imports of metallic elements and tungstic acid into Canada, for use only in the manufacture of metal filaments for electric lamps, were valued at \$57,919 in 1934 as compared with \$46,734 in 1933. Imports of chromium metal and tungsten metal, in lumps, etc., and alloy scrap for alloying purposes, totalled 26,222 pounds valued at \$16,461 in 1934 as against 17,755 pounds at \$8,801 in 1933.

September, 1935, New York quotation for tungsten, 98 per cent powdered was \$1.75 to \$1.90 per pound; tungsten ore—per unit WO_3 , N.Y. Chinese wolframite, \$15, duty paid. Bolivian scheelite, nominal. Domestic scheelite, good analysis, carload lots or more, \$15.

Table 173.—World Production of Tungsten Ore and Concentrates

(Supplied by Imperial Institute, London)

(Long tons)

Producing country	1932	1933	1934	Estimated WO ₃ Content		
				1932	1933	1934
BRITISH EMPIRE						
United Kingdom—Concentrates.....	2	11	190	1	7	131
Nigeria—Concentrates.....			5			3
South West Africa—Tungsten ore.....			16			10
Southern Rhodesia—Concentrates.....	13	30	106	8	20	69
India—Concentrates.....	2,023	2,147	3,329	1,315	1,396	2,164
Federated Malay States—Wolfram.....		33	29		21	19
Scheelite.....	302	918	1,508	223	679	1,085
Unfederated Malay States..Wolfram.....	129	79	78	84	51	51
Australia—Wolfram.....	44	117	254	29	83	165
Scheelite.....	(12 cwt.)		6	(8 cwt.)		4
New Zealand—Concentrates.....			39			25
FOREIGN COUNTRIES						
Portugal—Concentrates.....	257	298	579	158	189	360
Tin-tungsten ores.....	64	89	100	18	18	30
Spain—Concentrates.....	39	41	44	25	26	(a)
Mexico.....			73			47
United States—Concentrates.....	354	799	1,829	212	479	1,097
Argentina—Concentrates.....	6		(a)	4		(a)
Bolivia—Concentrates.....	671	230	782	405	140	469
Peru—Concentrates.....			11			7
China—Ore.....	2,146	5,400	4,700	1,288	3,240	2,820
French Indo-China—						
Tin-tungsten concentrates.....	218	208	272	145	149	179
Japan—Scheelite.....	20	29	64	13	19	42
Korea—Ore.....	56	150	363	36	98	236
Netherlands East Indies—Concentrates.....			2			2

(a) Information not available.

VANADIUM

No vanadium ores are produced in Canada. Relatively small quantities of the metal are known to occur in some of the magnetites of the Rainy River district in Ontario and some research has been conducted as to a method for its commercial recovery.

By far the greater amount of vanadium is consumed as a toughening element in the production of alloy steels and recently the metal is being used in cast irons.

Early production of vanadium came largely from Peru where certain bituminous coal deposits carry a relatively high percentage of vanadium pentoxide. Increased production in recent years has developed in South West Africa and Northern Rhodesia where the metal occurs with lead-zinc-copper ores. In the United States vanadium has been obtained chiefly from the carnotite ores of the Southwestern States. It was reported in the technical press, early in 1935, that vanadium stocks have been excessive and ore production slowed down. It has recently been reported that Russia's rare metals works in Moscow have made vanadium compounds for catalytic use. The vanadium being a by-product of radium isolated from tyuyamunite (a vanadate of lime and uranium) ore mined at Tyuya Muyun, Ferghana, Russian Turkestan. It has also been announced that vanadium was successfully recovered in Norway from pig iron made from vanadium-bearing ores, and similar developments in the U.S.S.R. are expected to result in an increase in world vanadium supply.

Vanadium ore prices—September, 1935—per pound V_2O_5 contained was $27\frac{1}{2}$ cents, f.o.b. shipping point. Ferrovadium, per pound of vanadium contained, delivered, \$2.70 to \$2.90.

Table 174.—World Production of Vanadium Ores, 1932-1934

(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934
BRITISH EMPIRE			
Northern Rhodesia—(V content).....	302	35	3
South West Africa.....	2,973	177	324
FOREIGN COUNTRIES			
United States (V_2O_5).....	103	2	(a)

(a) Information not available.

ZIRCONIUM

"The metallurgical uses of zirconium so far have failed to account for any large consumption but demands from the ceramic industries are increasing by leaps and bounds. Quite a few new zirconium salts, oxides and metallic forms were placed on the market in 1935. A newly created zirconium opacifier replaces tin oxide in vitreous enamels on a pound for pound basis, and although costing scarcely half as much, affords equal or better opacity and gloss.

"Important supplies of zircon are being furnished from Australia where at least three companies are engaged in recovering the mineral from an abundant supply of beach sand along the coast of New South Wales. The final separation is made by froth flotation."¹

"Zircon is the most common zirconium mineral and it or cyrtolite commonly occurs in greater or less amount in Canadian precambrian pegmatites, also in the pegmatitic-apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec. . . . Brazil is the chief source of commercial zirconium ore, greatly overshadowing all other occurrences in available reserves and cheapness of exploitation."²

Imports into Canada of zirconium silicate during 1934 amounted in value to \$2,029; imports of zirconium oxide for the same year were appraised at \$7,827.

⁽¹⁾ Paul M. Tyler, A.I.M.E.

⁽²⁾ Department of Mines, Ottawa, report 2314.

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

An increase in the development of Canadian deposits containing the non-ferrous metals has stimulated an expansion in the domestic smelting and refining of these metals. Abundant water power, conveniently located in regard to the mining districts, has made possible the generation of electric energy at such low cost that the utilization of electrochemical or electrothermic processes has been adopted for many metallurgical purposes. Some of the more important of these applications include the electrolysis of alumina and the production of aluminium in various forms in Quebec, the production of electrolytic copper at Montreal East; the refining of nickel and copper in central Ontario and the manufacture of refined zinc in Manitoba and British Columbia. Electrolytic lead is produced at Trail, British Columbia, by the Consolidated Mining and Smelting Company. Electric furnaces are also used throughout the world in the production of abrasives, ferro-alloys, titanium products, magnesium, beryllium, iron, ferro-silicon, carbides and cyanamide.

As a source of power, electric energy is being used to an ever increasing extent in mining and milling operations where important economies in operation are being effected.

In the extraction and treatment of ores, the mining and milling are so closely associated that it is impossible to make a separation of the statistics of these two operations. There is less difficulty in drawing a line between mining and milling on the one hand, and smelting and refining on the other, though there are cases where mining, milling and smelting operations are so closely related that it is very difficult to separate the figures on capital employed. This chapter is devoted to a consideration of the smelting and refining industry in Canada as it applies to the ores of the non-ferrous metals.

The estimated cost of ores, concentrates, matte, etc., treated in smelters and refineries in 1934 totalled \$78,325,552 as compared with \$43,242,563 in 1933; value of products in metallurgical plants in 1934 amounted to \$149,936,239 as against \$100,561,297 and the total value added through the treatment of crude or semi-crude mine material in Canadian works totalled \$71,610,687, representing an increase of 24.9 per cent over the corresponding value of \$57,318,734 in 1933.

Employees in the industry totalled 8,298 in 1934 as compared with 6,360 in 1933, an increase of 30.5 per cent. Salaries and wages paid amounted to \$11,059,206 as against \$8,403,181 in the preceding year; the number of employees in 1934 was only surpassed in the history of the industry by those of 1929, a year of extensive mine and plant development.

The results of the survey of the non-ferrous metallurgical industry are particularly interesting in 1934 in that they include particulars relating to the purchase of mine and mill equipment, insurance costs, etc., and are the first of this nature compiled since 1923. The total value of such items as reported by the nickel-copper mines, smelters and refineries; copper-gold mines, smelters and refineries; silver-lead-zinc smelters and refineries, and cobalt-silver smelters totalled \$35,029,644 in 1934. Some of the outstanding values for expenditures during the last calendar year include \$6,272,642 for incoming freight, \$2,082,485 for outgoing freight, \$5,429,202 for fuel, \$1,472,833 for smelter fluxes, \$1,384,388 for lumber, \$958,387 for electrical equipment, and \$573,535 for flotation reagents.

Review of the Industry by Provinces

Quebec.—Aluminium ores are not mined in Canada; however, the production of primary metallic aluminium in Quebec, from imported material, has constituted an important industry for several years. The Aluminium Company of Canada, Limited, the sole producer of new metal in the Dominion, operated its Shawinigan Falls fabricating plant continuously throughout 1934; the company's reduction works at Shawinigan Falls was inactive. The reduction plant of the company located at Arvida maintained steady production of aluminium ingot during the calendar year 1934. This plant employed both imported alumina and aluminium produced at Arvida; the slag ore works was not operated in 1934.

"The Mining Journal," London, reports the present capacity of the various aluminium reduction works of the United States of America, Canada, Scotland, Norway, France, Switzerland, Italy, Austria, Germany, Russia and Spain, could supply nearly 400,000 tons of virgin aluminium a year, and yet half a century ago barely 50 tons of this metal had been produced at a cost of roughly 30s. a pound. The price of the virgin metal is now quoted at about a shilling a pound, and this price has been more or less maintained since the slump period of 1921.

During 1934 the Noranda smelter treated 1,050,684 tons of copper-gold-silver ore, concentrate and refinery slag, and produced 70,607,764 pounds of anodes, the average analysis of which was 99.39% copper, 7.04 oz. gold per ton, and 15.66 oz. silver per ton. The following table shows the amount of material treated in the Noranda smelter and the production each year since commencement of operations:—

Year	Tons of ore, concentrate and refinery slag smelted	Pounds of fine copper produced	Gold produced	Silver produced
1927.....			ounces	ounces
1928.....	10,740	552,345	767	2,644
1929.....	271,926	33,065,261	52,949	186,277
1930.....	428,221	51,223,115	68,732	334,279
1931.....	734,072	75,509,373	117,393	691,920
1932.....	765,544	62,859,355	253,363	558,801
1933.....	918,567	63,013,485	341,350	619,597
1934.....	1,010,629	65,008,731	284,675	510,739
1934.....	1,050,684	70,175,512	248,615	552,809

During 1934 the concentrator treated 920,363 tons of ore from the Horne mine, the average assay of which was 2.34% copper, 0.125 oz. gold per ton, and 0.32 oz. silver per ton, from which 181,938 tons of concentrate were produced and sent to the smelter. In April, 1934, the rated daily capacity of the concentrator was increased from 2,000 to 3,000 tons and at the same time additional equipment designed to regrind and retreat the entire mill tailing was placed in operation. This tailing retreatment plant is operating very satisfactorily and is effecting a substantial saving of gold that was formerly lost in the tailing. A hundred ton experimental cyanide unit designed to extract additional gold from the pyrite residue of the retreated mill tailing was constructed and placed in operation in June, 1934. The results obtained from this unit were so satisfactory that a separate 500 ton cyanide mill to treat the entire pyrite portion of the tailing was constructed and placed in operation in 1935. The converter Cottrell plant was increased to twice its former size and capacity and the power house extended to accommodate a 2,600 k.w. steam turbine driven generator to be installed as an auxiliary source of power.

At Montreal East, the electrolytic copper refinery of Canadian Copper Refiners, Ltd., maintained steady production throughout 1934. Blister copper from Flin Flon, Manitoba, and anode copper from Noranda, Quebec, are treated in this plant for the production of refined copper, gold and silver; refined copper is marketed in the form of wire bars, ingot bars, and cathodes. Selenium is now being produced in substantial tonnage at the refinery; production of tellurium has been delayed as, owing to the demand for selenium, efforts were concentrated on the production of the latter metal; it is expected that tellurium will be produced in 1935.

Ontario.—The International Nickel Company of Canada, Limited, reported that operations throughout the year, conducted on an increased scale and at a uniform rate, afforded the management opportunity to cut costs of production to the lowest figures obtaining since the plants were reconstructed and the Frood mine fully developed. The expanded operations called for additions to payrolls and decreased unemployment in the various localities in which operations were conducted. The concentrator of the company was operated at a uniform rate during 1934 and treated 1,843,146 tons of ore, the greatest tonnage thus far handled. As the result of certain re-arrangement of equipment and with the completion of some minor installations the available capacity in the grinding and flotation sections is 8,000 tons per day. This capacity can be readily increased to 11,000 tons per day should demand call for increased quantities of nickel. The Copper Cliff smelter produced 92,174 tons of bessemer matte and 97,611 tons of blister copper. Three reverberatory furnaces were in operation throughout the year. The installation of additional converters was completed; this not only adds to plant capacity, but from a metallurgical standpoint balances adequately the copper and nickel smelting operations. For the

Orford separation process one blast furnace was used in 1934 and a second for seven months. At the Coniston smelter three blast furnaces were in operation up to April 1st and four thereafter; during the year 840,980 tons of ore were smelted and 59,732 tons of bessemer matte produced. All of the four hydro-electric plants were in use throughout the year.

At the Port Colborne nickel refinery six electrolytic circuits were in continuous operation during the year and a seventh was in use from April to August inclusive. The total output of nickel, inclusive of nickel in oxide, was 70,974,850 pounds.

The electrolytic copper refinery of the Ontario Refining Company, Limited, (90% owned by the International Nickel Company of Canada, Limited), maintained steady production at Copper Cliff, Ontario, throughout 1934. As a result of increased nickel production there was a corresponding increase in the tonnage of blister copper received from the Copper Cliff smelter, which rose from approximately 6,500 tons per month at the beginning of the year to 9,000 tons per month during the last quarter. Refined copper production amounted to 95,558 tons compared with 58,098 tons in 1933. Shipments from the refinery were 97,292 tons in 1934 compared with 53,678 tons in 1933. Selenium and tellurium are now regularly produced as by-products in addition to by-product gold, silver and platinum metals. A plant for refining tellurium was constructed during the year and was started in October, 1934. Selenium has found its best use as a decolorizer and as a base for various colors in the manufacture of glass. An interesting application is found in the photo-electric cell. Tellurium is used as a hardening and strengthening agent in lead and its alloys.

In the manufacture of rubber products strength and resistance to abrasion are improved by the use of selenium and tellurium.

The mill and smelter of Falconbridge Nickel Mines, Limited, operated throughout 1934 with only the normal interruptions for repairs and the excellent overall metallurgical recovery was reported as slightly improved. No important changes occurred during the year in the milling and smelting plants. It was rather a year of crowding the existing facilities to their utmost with the result that 272,923 tons were treated or 17 per cent more than the previous year. Results of operations are tabulated as follows:—

Total ore treated.....	272,923	short tons
Matte produced.....	9,271.4	short tons
Nickel in matte produced.....	5,202.6	short tons
Copper in matte produced.....	2,450.8	short tons
Metals per ton in ore.....	41.00 lb. nickel and 19.90 lb. copper	
Metallurgical losses per ton of ore.....	2.88 lb. nickel and 1.94 lb. copper	

From 317,646 tons of ore delivered to the crushing plant 44,116 tons or 13.9 per cent of waste was eliminated by sorting and discarded.

The plants of the Deloro Smelting and Refining Company, Limited, located at Deloro, Hastings county, were operated continuously during 1934. Silver-cobalt ores from the Cobalt and Gowganda areas were treated by the company for the production of silver bullion, white arsenic, cobalt metal, cobalt oxides and salts, and nickel oxide. A silver lead-bismuth bullion was also exported by the company.

It is interesting to note, that according to a statement by Sir Edmund Davis, 1,217,925 pounds of by-product cobalt were recovered for the fourteen months to the end of August, 1934, from ore on the Mindola section of Rhokana in Northern Rhodesia and Union Minière du Haut-Katanga have announced that the cobalt market developed substantially in 1934, the tonnage of its sales being heavier than for any previous year.

At Port Hope the radium refinery of Eldorado Gold Mines, Limited, was in continuous operation during 1934. Silver pitchblende ores and concentrates from Great Bear Lake, North West Territories, were treated in this plant and products included radium salts, sodium uranate (orange), sodium uranate (yellow), uranium oxide (black), uranium salts, and by-product silver and lead. During 1934 the plant was reported to have received from the mine 77 tons of pitchblende and silver ore and 7 tons of silver concentrates. Twenty-six tons of ore were treated

during the year with recovery of radium, uranium, silver and lead amounting to \$210,000 leaving 48 tons of roasted ore on hand at December 31, 1934. During the period January 1, 1935, to May 31, 1935, the remaining 48 tons of ore were treated with recovery amounting to \$250,000, in addition to which there remained in the plant in process about \$135,000 in products. Radium has been supplied to the following countries: England, Ireland, Scotland, United States, South Africa, Egypt, Iraq, Cyprus, Esthonia, Australia and Canada.

Manitoba and Saskatchewan.—The Flin Flon mine, copper smelter and zinc refinery are situated on the interprovincial boundary of Manitoba and Saskatchewan, and for this reason, the operations of the Hudson Bay Mining and Smelting Company, Limited, are reviewed under the heading of the two provinces.

There was treated by the concentrator during 1934 an average daily tonnage during the days the plant operated of 4,420 or a total for the eleven months operated during the year of 1,463,716 tons of ore. This averaged gold, ounces .095; silver, ounces 1.45; copper, 1.71 per cent, and zinc, 4.4 per cent. The tonnage treated was approximately the same as that treated during the previous year. From the 1934 tonnage there were produced 250,595 tons of copper concentrates, assaying gold, ounces 0.353; silver, ounces 5.16; copper, 8.29 per cent, and 76,149 tons of zinc concentrates assaying gold, .071 ounces; silver, 1.90 ounces; copper, 0.87 per cent, and zinc, 45.5 per cent.

The operation of the cyanide annex continued with minor changes, all of which tended towards improving the operations. A maximum tonnage of 921,388 was put through this plant; this consisted of sulphide ore tailings averaging .0417 oz. gold per ton and .605 ounces of silver per ton.

The copper smelter was operated continuously during the year with the exception of the strike period. There were smelted in the reverberatory in 1934, 245,425 tons of Flin Flon ore and concentrates; from the Flin Flon concentrates and other products there were produced and shipped 19,101 tons of blister copper containing a total of 99,334 ounces gold, 1,348,807 ounces of silver, and 37,677,064 pounds of copper. The average tonnage of new material treated per day by the smelter was 828 tons.

The electrolytic zinc plant operated steadily throughout 1934 with the exception of June, the strike month. There were treated during the year 72,896 tons of zinc concentrates averaging gold, .070 ounces; silver, 1.89 ounces; copper, 0.89 per cent, and zinc, 45.5 per cent, from which were produced 49,427,280 pounds of zinc, the average grade of which was 99.9893 per cent zinc. In 1934 the refinery produced 647 tons of die casting zinc averaging 99.9919 per cent zinc. The amount of cadmium precipitate in stock at the close of 1934 totalled 5,495 tons, the metal content of which is cadmium, 3.63 per cent, copper, 6.76 per cent, and zinc, 55.0 per cent.

British Columbia.—The Consolidated Mining and Smelting Company of Canada, Limited, reported that the cost of producing lead and zinc was again the lowest in the history of the company. Cost reductions in 1934 were due largely to the enhancement in the value of silver (silver values being credited against the cost of lead and zinc) and to the increased tonnages handled.

Concentration costs at the Kimberley concentrator were slightly above the record of 1933. Recoveries, while good in comparison with all other years, were a little below those of 1933. The drop in recoveries is ascribed partly to the larger tonnage treated, 25 per cent over 1933, and partly to the oxidation due to sprinkling the ore to control the dust. The small increase in mining and concentrating costs was much more than offset by the increased value of silver, with the result that the cost of both lead and zinc in concentrates constituted on all time low record.

The 1933 record costs of smelting lead were maintained in 1934. Lead losses were a little higher owing to smelting a large tonnage of Rossland ore in the lead plant, the available tonnage of this ore not being sufficient to run a copper furnace.

Record costs and recoveries were made in the zinc plant; the reduction in cost was mainly due to larger tonnage and to the new roasting process. The cadmium and bismuth plants, both by-product works, are only run as occasion demands.

Following is the metal production and tonnage treated at Kimberley and Trail plants together, from 1894 to date, and for 1934:—

	Tons ore treated	Gold produced	Silver produced
		ounces	ounces
1894 to date.....	24,463,646	2,381,581	113,951,029
1934.....	1,792,298	35,328	7,316,231
	Lead produced	Copper produced	Zinc produced
	pounds	pounds	pounds
1894 to date.....	3,797,121,176	184,673,769	2,020,575,232
1934.....	315,340,312	1,567,078	221,955,701
	Cadmium produced	Bismuth produced	Fertilizer
	pounds	pounds	tons
1894 to date.....	2,650,668	576,871	237,706
1934.....	293,611	246,092	82,497

The plants of Granby Consolidated Mining, Smelting and Power Company, Limited, located at Anyox consist of a crushing plant and concentrator of about 5,000 tons capacity, smelter, coke ovens and power plant. During 1934 the continued low copper price adversely affected the Granby operations at Anyox and the bulk of the blister output was necessarily stored. A generally lower tenor of ore was met by a slight increase in tonnage to the mill, which, towards the end of the year, was treating about 5,200 tons of ore per day. No new ore developments of importance materialized in the mine during the year. In the early part of December a blast involving 500,000 or more tons of ore, mainly in pillars and sills of old stopes in No. 1 and No. 5 orebodies between the 385 foot level and surface, was carried out. About 1,100 men were employed at Anyox with a payroll of \$135,000 per month. Mining operations of the company were discontinued in July, 1935. "The Miner," Vancouver, comments on Granby as follows: "The operating efficiency that distinguished the first, or boundary, stage of the Granby undertaking, has been more than duplicated in the lost stage at Anyox, and during the past few years in particular. Indeed, in point of low cost production of copper, we question if any mine in the world, where the conditions are similar, can show comparable results with Granby. This has meant, that although during the depression period, with the world price of copper falling below six cents a pound, the company has continued to operate,—not without loss, it is true,—but nevertheless to operate. Corporations are supposed to be soulless, but it is difficult, as we have previously noted, to discover motives other than primarily benevolent to its employees and their community in the company's policy since 1933 of continuing to produce copper for accumulation when metal could have been purchased in the open market at a price considerably below the cost of production at Anyox.... actually the Anyox orebodies, commercially considered, were depleted three years ago...."

It is noteworthy that the new electrolytic copper refinery erected at the Nkana smelter in Northern Rhodesia put its anode department into operation in September, 1934; the first cathode section was put into circuit on December 4th and the first cathode production was drawn on December 21st. The new refinery consists essentially of an anode department, making anodes of refined blister copper, an electrolytic tank house, which converts the anodes into cathodes by electro-deposition, and a furnace refinery which melts and casts the cathodes into commercial shapes. Necessary installations auxiliary to these are the electric sub-station and slimes treatment plant. The rated capacity of the refinery as built is 36,500 short tons of refined copper output per year, but the site chosen will allow for extension to five times its present capacity when desired. Nkana blister copper is of exceptional purity containing about 99.5 per cent copper.

Table 175.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1933 and 1934

	1933	1934
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment..... (Estimated value if rented.)	101,508,625	100,334,062
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	12,446,854	14,264,927
(c) Inventory value of finished products on hand.....	16,768,493	16,584,377
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	15,361,312	14,864,056
Total.....	146,085,284	146,047,422

Table 176.—Principal Statistics, Including Ores, Concentrates and Residues Smelted and Value of Smelter and Refinery Products in the Non-Ferrous Smelting and Refining Industry, 1933 and 1934

	1933	1934
Number of companies.....	11	11
Number of plants.....	14	14
Capital employed..... \$	146,085,284	146,047,422
Number of salaried employees.....	679	849
Salaries..... \$	1,461,380	1,842,449
Number of wage-earners.....	5,681	7,449
Wages..... \$	6,941,801	9,216,757
Cost of fuel and electricity..... \$	7,809,936	10,477,562
Estimated cost of ores, matte concentrates, etc., treated..... \$	43,242,563	78,325,552
Value of plant products*..... \$	100,561,297	149,936,239
Value added by smelting..... \$	57,318,734	71,610,687

*Products include gold, silver, platinum metals, blister and anode copper, refined lead, zinc, copper and nickel, nickel-copper matte, nickel oxide, nickel salts, cobalt, cobalt oxide, aluminium, base bullion, cadmium, bismuth, arsenic, tellurium, selenium, radium and uranium salts and oxides.

Table 177.—Number of Wage-Earners by Months, in the Non-Ferrous Smelting and Refining Industry, 1932, 1933 and 1934

Month	1932	1933	1934
January.....	5,496	5,003	6,870
February.....	5,400	4,831	6,832
March.....	5,355	4,926	7,034
April.....	4,750	4,890	7,264
May.....	4,297	4,910	7,530
June.....	4,475	5,534	7,717
July.....	4,205	6,080	7,734
August.....	4,160	6,322	7,767
September.....	4,198	6,368	7,595
October.....	4,326	6,478	7,816
November.....	4,316	6,396	7,620
December.....	4,274	6,410	7,606
Average.....	4,601	5,681	7,449

Table 178.—Capacities of Canadian Copper Smelting and Refining Works, 1934*

Company	Blast furnaces		Reverberatories		Converters	
	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates
Consolidated Mining & Smelting Co. (†).....			1	48,000	2	16,000
Falconbridge Nickel Mines.....	1	200,000			2	35,000
Granby Consolidated Mining, Smelting & Power Co.....	2	200,000			3	15,000
Hudson Bay Mining & Smelting Co.....			1	325,000	2	
Noranda Mines.....			2	900,000	4	150,000
International Nickel Co.....	4	800,000	5	2,100,000	17	

ELECTROLYTIC COPPER REFINERIES—		Annual capacity—short tons
Canadian Copper Refiners, Ltd.....		65,000
Ontario Refining Co., Ltd.....		120,000

*American Bureau of Metal Statistics.

†Idle.

Table 179.—Capacity and Production of Electrolytic Zinc Plants and Lead Smelting Capacity in Canada, 1932-1934

—	Maximum horse-power used	Estimated annual capacity for cathode zinc (short tons)	Actual production as ingot zinc (short tons)		
			1932	1933	1934
Consolidated Mining & Smelting Co. of Canada, Ltd...	73,000	146,000	65,284	68,810	110,217
Hudson Bay Mining & Smelting Co., Ltd.....	13,500	23,400	20,868	23,153	24,714

LEAD SMELTING CAPACITY IN CANADA, 1934.

Company	Situation of plant	Number of blast furnaces	Annual capacity (tons of charge)
Consolidated Mining & Smelting Co.....	Trail, B.C.	5	700,000

Supplied by the American Bureau of Metal Statistics.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS, PEAT AND PETROLEUM INDUSTRIES (Fuels) IN CANADA

The Coal Mining Industry in Canada

1. General Review
2. Commodity Statistics on Coal—including Tables on Output, Disposition, Shipments, Imports into Canada and Exports, Consumption and World Output

The Coke and Gas Industry in Canada

The Peat Industry in Canada

The Petroleum Industry in Canada

1. Production of Crude Petroleum
2. Production of Petroleum Products

NOTE.—In order to correlate data, regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, peat and petroleum industries. This survey presents information in detail regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

THE COAL MINING INDUSTRY

Coal production in Canada during 1934 advanced to 13,810,193 tons worth \$42,045,942 from the 1933 total of 11,903,344 tons valued at \$35,923,962. The 1934 output included 10,058,782 tons of bituminous coal, 537,508 tons of sub-bituminous coal and 3,213,903 tons of lignite coal. In 1933, bituminous coal production totalled 7,979,283 tons, sub-bituminous coal, 554,118 tons, and lignite coal, 3,369,943 tons.

Nova Scotia mines produced 6,341,625 tons during 1934; this represented a 39.1 per cent increase over the tonnage mined in 1933. New Brunswick's output advanced slightly to 314,750 tons from the preceding year's total of 312,303 tons. Manitoba produced 4,113 tons as against 3,880 tons in 1933. A 2 per cent decline was recorded in Saskatchewan's production; the 1934 total was 909,288 tons and the 1933 output, 927,649 tons. Reports from Alberta operators show that 4,753,810 tons were mined in 1934 as compared with 4,718,788 tons in 1933. The first upward trend in coal output in British Columbia since 1928 was recorded during the year under review; the 1934 production totalled 1,485,969 tons while in 1933 the output was 1,382,272 tons. The Yukon output declined to 638 tons from the 1933 total of 862 tons.

Exports of Canadian coal declined steadily from 1927 to 1933; in the former year 1,113,330 tons were exported while in the latter year only 259,233 tons were shipped from Canada. During 1934, the Canadian exports totalled 306,335 tons, made up of 212,151 tons cleared through Nova Scotia, New Brunswick, Quebec and Ontario ports, and 94,184 tons shipped through Manitoba, Saskatchewan, Alberta and British Columbia ports.

Imports of coal into Canada in 1934 reached a total of 13,813,657 tons as compared with 11,465,976 tons imported in the preceding year. Anthracite coal importations in 1934 totalled 3,537,309 tons, of which Great Britain supplied 1,643,516 tons, the United States, 1,804,127 tons, Germany, 72,103 tons, Belgium, 17,557 tons, and Newfoundland, 6 tons. These data show that Great Britain supplied 46.5 per cent of Canada's anthracite supply in 1934 as compared with 52.9 per cent in the preceding year and 44.6 per cent in 1932. The United States contributed 51 per cent of the 1934 anthracite importations, 47.1 per cent of the 1933 and 53.7 per cent of the 1932 imports. Bituminous coal receipts in 1934 rose to 10,273,557 tons from the 1933 total

of 8,427,656 tons. The 1934 importations included 96·76 per cent from the United States, 3·22 per cent from Great Britain and the remainder from Japan, Norway, Germany, Newfoundland and Sweden. Imports of lignite coal from the United States amounted to 2,791 tons in 1934 as against 2,707 tons in 1933.

Employment was furnished by the Canadian coal mines to 24,671 men during 1934; in the preceding year an average of 24,812 men were employed. Wage-earners employed in the eastern coal mines numbered 13,086 and in the western mines, 11,585 men. An average of 238 days work was furnished surface employees and 207 days to underground workers in 1934. In addition to these men there were 1,290 salaried employees on the mine payrolls in 1934. All employees working in or about the coal mines received \$25,662,591 in 1934; during the preceding year salaries and wages totalled \$22,378,736. Corresponding with the advance in output in 1934 there was a considerable increase in the number of man-days work furnished to wage-earners. During the year these men received 5,270,076 days work as against 4,511,345 man-days work in 1933.

Coal consumption in Canada in 1934 was computed at 27,317,515 tons; in the preceding year 23,110,087 tons were made available for consumption. In addition to coal, Canada consumes large quantities of coke, natural and artificial gas, fuel oil, wood and electricity for industrial and domestic purposes.

In 1934 the Canadian coke supply was estimated at 3,166,245 tons or 31·3 per cent above the 1933 total. Canadian coke producers sold 1,474,916 tons in 1934; this represented 67·6 per cent of the year's output. Coke importations increased 44·4 per cent in 1934 to 930,221 tons from the 1933 imports of 644,075 tons. The coal equivalent of the imported coke was 1,431,138 tons. Approximately 844,303 tons of Canadian bituminous coal were used by Canadian coke and artificial gas manufacturers in 1934; in addition, 2,271,801 tons of imported coal were used.

Manufactured gas consumption for domestic and industrial purposes in Canada amounted to 15,409,927 thousand cubic feet in 1934 as compared with 15,893,248 thousand cubic feet in the preceding year. Natural gas consumption in 1934 consisted of 15,300,000 thousand cubic feet for domestic purposes and 7,000,000 thousand cubic feet for industrial use. The estimated displacement of coal through the domestic consumption of natural gas in 1934 was 612,000 tons.

The Canadian consumption of fuel oil in 1934 totalled 400·7 million imperial gallons and of gas oils, 102·3 million imperial gallons; in 1933 fuel oil consumption amounted to 389·8 million imperial gallons and gas oils to 91·9 million imperial gallons. According to the Dominion Fuel Board's survey of fuel oil consumption, 97·1 million imperial gallons were consumed for domestic and building heating in 1933; industrial consumption totalled 74·4 million imperial gallons; tractor fuel, 12·6 million imperial gallons; railroads, 49·5 million imperial gallons, and bunkering purposes, 129 million imperial gallons. A possible coal displacement of 693,571 tons was indicated by the quantity of fuel oil used for domestic purposes in 1933.

Table 180.—Capital Employed in the Coal Mines of Canada, by Provinces, 1933 and 1934

Province	1933				1934			
	Capital employed as represented by				Capital employed as represented by			
	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	46,218,286	1,883,877	4,412,256	52,514,419	40,360,939	3,008,993	4,293,277	47,663,209
New Brunswick...	1,541,080	25,335	214,956	1,781,371	1,486,916	28,063	341,413	1,856,392
Manitoba.....	2,010	.....	1,183	3,193	2,304	.....	600	2,904
Saskatchewan....	4,882,884	75,362	252,917	5,211,163	4,818,248	123,981	240,473	5,182,702
Alberta.....	36,577,858	1,207,324	6,070,698	43,855,880	33,845,242	1,230,576	6,356,058	41,431,876
British Columbia..	19,348,706	506,109	2,316,949	22,171,764	18,994,859	529,293	2,409,651	21,933,803
Yukon.....	203,000	.....	.....	203,000	203,000	520	.....	203,520
Canada.....	108,773,821	3,693,007	13,268,959	125,740,790	99,711,505	4,921,426	13,611,472	118,274,406

Table 181.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1934

Province	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Surface	Under-ground				
						\$	\$	\$
Nova Scotia.....	395	55	2,000	10,051	12,501	782,454	12,055,775	12,838,229
New Brunswick.....	28	6	202	833	1,069	66,201	678,844	745,045
Manitoba.....			4	8	12		5,364	5,364
Saskatchewan.....	44	6	263	619	932	93,787	546,177	639,964
Alberta.....	522	32	2,066	5,773	8,393	1,174,269	6,895,136	8,069,405
British Columbia.....	185	17	890	1,959	3,051	462,894	2,900,190	3,363,084
Yukon.....			1	2	3		1,500	1,500
Canada.....	1,174	116	5,426	19,245	25,961	2,579,605	23,082,986	25,662,591

Table 182.—Wage-earners Employed in the Coal Mines of Canada, by Classes and by Provinces, 1934, with Comparative Totals for 1933

Classification	Province							Canada		
	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Surface	Under-ground	Total
Administration.....	58	17		10	62	11		158		158
Officials, foremen and clerks.....	693	34	1	76	613	173	1	531	1,060	1,591
Screenmen and loaders.....	612	46	2	87	633	140		1,521		1,521
Stripping shovel operators.....				4				4		4
Hand cutters and helpers.....	838	542	7	412	1,814	741	1		4,355	4,355
Machine cutters and helpers.....	1,004	43		31	378	112			1,568	1,568
Machine loaders and helpers.....	1,943	114		28	1,626	177			3,888	3,888
Horse haulage employees.....	439	3		63	440	167		65	1,047	1,112
Mechanical haulage employees.....	1,448	4		26	366	237		122	1,959	2,081
Ventilation employees.....	229	1		4	67	28		1	328	329
Roadmakers.....	270	14		13	130	38		6	459	465
Timbermen.....	1,038	30	1	9	225	110		15	1,398	1,413
Pumpmen.....	87	6		5	48	17		9	154	163
Loading shovel.....				7				7		7
Cleaning shovel.....				2				2		2
Chute loaders.....	76				139	9			224	224
Enginemen.....	241	17	1	12	154	65		407	83	490
Firemen.....	134	2		14	96	41		287		287
Machinists.....	183	1		5	63	39		279	12	291
Carpenters and masons.....	122	6		4	48	47		226	1	227
Other mechanics.....	302	2		7	95	164		274	296	570
Japanese.....						20		1	19	20
Chinese.....						99		97	2	99
Indians.....										
All other employees.....	2,334	153		63	842	414		1,414	2,392	3,806
Total for 1934.....	12,051	1,035	12	882	7,839	2,849	3	5,426	19,245	24,671
Total for 1933.....	11,861	1,025	10	891	7,971	3,050	4	5,433	19,379	24,812

Table 183.—Output of Coal from Canadian Mines, 1925-1934

Year	Short tons	Value	Average per ton
		\$	\$
1925.....	13,134,968	49,261,951	3.75
1926.....	16,478,131	59,875,094	3.63
1927.....	17,426,861	61,867,463	3.55
1928.....	17,564,293	63,757,833	3.66
1929.....	17,496,557	63,065,170	3.60
1930.....	14,881,324	52,849,748	3.55
1931.....	12,243,211	41,207,682	3.37
1932.....	11,738,913	37,117,695	3.16
1933.....	11,903,344	35,923,962	3.02
1934.....	13,810,607	42,045,942	3.04

Table 184.—Output and Value of Coal in Canada, by Kinds and by Provinces, 1933 and 1934

(Short tons)

Province	1933			1934		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	36	4,557,590	15,969,793	37	6,341,625	21,860,093
NEW BRUNSWICK (Bituminous).....	34	312,303	1,041,744	25	314,750	1,026,343
MANITOBA (Lignite).....	2	3,880	9,214	3	4,113	8,952
SASKATCHEWAN (Lignite).....	*106	927,649	1,285,996	*132	909,288	1,241,130
ALBERTA—						
Bituminous.....	15	1,726,256	5,435,656	16	1,915,800	6,116,513
Sub-bituminous.....	21	554,118	1,274,017	19	537,508	1,256,936
Lignite.....	†296	2,438,414	5,597,585	†280	2,300,502	5,182,650
Total.....	332	4,718,788	12,307,258	315	4,753,810	12,556,099
BRITISH COLUMBIA (Bituminous).....	24	1,382,272	5,306,287	21	1,485,969	5,351,108
YUKON (Bituminous).....	1	862	3,670	1	638	2,217
Canada—						
Bituminous.....	110	7,979,283	27,757,150	100	10,058,782	34,356,274
Sub-bituminous.....	21	554,118	1,274,017	19	537,508	1,256,936
Lignite.....	404	3,369,943	6,892,795	413	3,213,903	6,432,732
Total.....	535	11,903,344	35,923,962	534	13,810,193	42,045,942

* Exclusive of 93 small mines in operation during part of 1933 and 92 small mines operating during part of 1934.

† Exclusive of 66 small mines operated under special permits in 1933 and 33 small mines in 1934.

Table 185.—Disposition of Coal from Canadian Mines, 1933 and 1934

	1933			1934		
	Total coal	Total value	Average value per ton	Total coal	Total value	Average value per ton
	Tons	\$	\$	Tons	\$	\$
Supplied to employees for domestic consumption.....	152,724	437,475	2.86	167,005	472,549	2.82
Used for power purposes—						
(a) Shops.....	87,633	312,378	3.57	84,748	291,208	3.43
(b) Colliery boilers.....	546,088	1,431,573	2.62	569,430	1,513,119	2.65
(c) Companies' railroads.....	56,272	200,193	3.56	68,604	250,300	3.65
(d) Harbour tugs and dredges.....						
Shipped. (See Table 187)—						
(a) Ships' bunkers.....	233,847	33,367,673	3.10	340,483	38,921,745	3.11
(b) Railroads.....	2,634,006			3,178,701		
(c) Other.....	7,904,327			8,986,780		
Used in making coke at colliery.....	84,723	249,815	2.95	131,962	368,203	2.79
Used in making briquettes.....	15,886	49,700	3.13	15,028	48,323	3.22
Put on bank.....	487,197	1,674,828	3.44	866,819	2,955,933	3.41
Put on waste heap.....	230,724			230,311		
Total disposition.....	12,433,427	37,723,635	3.03	14,639,871	44,821,380	3.06
Lifted from bank.....	518,991	1,799,673	3.47	814,880	2,775,438	3.40
Lifted from waste heap.....	11,092			14,798		
Total output.....	11,903,344	35,923,962	3.02	13,810,193	42,045,942	3.04

Table 186.—Disposition of Coal from Canadian Mines, by Provinces, 1934

(Short tons)

	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Canada
Supplied to employees for domestic consumption.....	109,979	3,441	52	3,388	35,491	14,648	6	167,005
Coal shipped. (See Table 187).....	5,737,906	307,988	4,006	866,800	4,320,121	1,268,952	191	12,505,964
Used under colliery boilers, etc.....	266,557	1,695	55	24,404	175,176	101,520	23	569,430
Used by companies' railroads.....	44,856	900		6,965	7,084	8,799		68,604
Used for manufacture of coke at colliery.....					91,745	40,217		131,962
Used in making briquettes.....				264	14,764			15,028
Used in shops, etc.....	84,748							84,748
Used by harbour tugs and dredges.....								
Put on bank.....	747,118	16,663		6,983	51,205	44,828	22	866,819
Put on waste heap.....	48,484	703		6,731	115,181	58,816	396	230,311
Total disposition.....	7,039,648	331,390	4,113	915,535	4,810,767	1,537,780	638	14,639,871
Lifted from bank.....	698,023	16,629		5,757	52,401	42,070		814,880
Lifted from waste heap.....		11		490	4,556	9,741		14,798
Total output.....	6,341,625	314,750	4,113	909,288	4,753,810	1,485,969	638	13,810,193

Table 187.—Shipments of Coal from Canadian Mines, by Grades and Destinations, 1933 and 1934

Destination	1933				1934			
	Run-of-mine	Screened	Slack	Total	Run-of-mine	Screened	Slack	Total
Prince Edward Island.....	4,320	50,873	8,533	63,726	5,748	59,670	10,270	75,688
Nova Scotia.....	110,042	294,894	477,892	882,828	124,542	418,916	625,418	1,168,876
New Brunswick.....	126,697	110,157	217,649	454,503	135,069	117,653	249,606	502,328
Quebec.....	58,128	1,070,384	870,473	1,998,985	121,709	1,308,956	1,453,944	2,884,609
Ontario.....	482	34,361	12,328	47,171	5,273	53,025	20,613	78,911
Manitoba.....	102,054	350,789	452,540	905,383	70,541	304,460	499,551	874,552
Saskatchewan.....	280,407	826,470	448,060	1,554,937	239,046	721,074	511,582	1,471,702
Alberta.....	196,888	422,186	471,692	1,090,766	190,133	393,206	480,629	1,063,968
British Columbia.....	19,362	584,767	132,987	737,116	18,095	465,874	167,133	651,102
Yukon.....		323		328		191		191
Northwest Territories.....						31		31
Total domestic shipments..	898,380	3,745,209	3,092,154	7,735,743	910,156	3,843,056	4,018,746	8,771,958
Railroads. (In Canada.....)	2,002,784	523,616	110,859	2,637,259	2,466,488	607,940	93,655	3,168,083
Ships' bunkers.....	162,043	71,804		233,847	234,910	105,243	330	340,483
Total railroads and ships' bunkers.....	2,164,827	595,420	110,859	2,871,106	2,711,962	713,183	94,039	3,519,184
United States.....	1,515	18,097	58,131	77,743	2,735	21,136	53,506	77,377
Alaska.....		14,249		14,249		15,290		15,290
Newfoundland.....	9,940	61,045	1,359	72,344	4,116	115,697	120	119,933
Other countries.....		995		995		2,222		2,222
Total external shipments...	11,455	94,386	59,490	165,331	6,851	154,345	53,626	214,822
Total.....	3,074,662	4,435,015	3,252,503	10,772,180	3,628,969	4,710,584	4,166,411	12,505,964

Table 188.—Imports of Anthracite and Bituminous Coal into Canada from Great Britain, by Grades and by Provinces, 1933 and 1934

(Short tons)

Destination	1933				1934			
	Anthracite			Bituminous all grades	Anthracite			Bituminous all grades
	Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.		Grate, egg, stove, nut, and pea	Screenings or or dust	N.O.P.	
Prince Edward Island.....	2,863			1,677			9,557	1,992
Nova Scotia.....	49,785			59,984	54,623		339	51,719
New Brunswick.....	76,331		247	10,790	78,700		434	12,789
Quebec.....	1,329,083	2,168	116,608	244,276	1,427,677	31,077	8,662	263,357
Central Ontario.....	24,894			1,205	32,165			
Head of Lakes.....								
Manitoba.....			150	1,178				1,506
Saskatchewan.....			101	101				112
British Columbia.....			3,647	18,850			282	42
Canada.....	1,483,956	2,168	120,652	338,061	1,593,165	31,077	19,274	331,517

Table 189.—Imports of Anthracite, Bituminous and Lignite Coal into Canada from the United States, by Grades and by Provinces, 1933 and 1934

(Short tons)

Destination	1933					1934				
	Anthracite			Bituminous, all grades	Lignite	Anthracite			Bituminous, all grades	Lignite
	Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.			Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.		
Prince Edward Island.....	678			133				1,153	99	
Nova Scotia.....	7,850			448		11,677			678	
New Brunswick.....	18,685		267	9,249		22,513		103	23,020	
Quebec.....	234,910	5,761	43,128	433,706		293,092	8,997	106,826	659,565	
Ontario.....	1,001,561	2,273	109,063	7,624,429		1,206,051	4,172	143,457	9,243,021	
Manitoba.....	1,804	95	3,620	12,035	292	388		5,698	10,597	253
Saskatchewan.....		32	25	1,226	317				1,123	42
Alberta.....			75	998					1,302	10
British Columbia.....			2	7,220	2,098				1,928	2,486
Yukon.....				7					37	
Canada.....	1,265,488	8,161	156,130	8,039,451	2,707	1,533,721	13,169	257,237	9,941,371	2,791

Table 190.—Imports of Anthracite and Bituminous Coal into Canada from Other Countries, by Provinces, 1933 and 1934

(Short tons)

Destination	Source	1933				1934			
		Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
		Grate, egg, stove, nut and pea	Screenings or dust	N.O.P.		Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.	
Prince Edward Island.....	Newfoundland.....								24
New Brunswick.....	Germany.....				144				
Quebec.....	Germany.....					72,103			50
	Belgium.....					17,557			
	Newfoundland.....					6			
	Norway.....								280
	Sweden.....								15
British Columbia.....	China.....			6					
	Japan.....								300
	Alaska.....			2					
Canada.....				8	144	89,666			669

Table 191.—Average Imports of Coal into Canada, by Kinds and by Provinces, for the Five Years, 1930-1934

(Short tons)

Destination	Anthracite			Total bituminous	Lignite	Total all grades
	Grate, egg, stove, nut and pea	Other	Total			
Prince Edward Island.....	4,006	3,667	7,673	4,226		11,899
Nova Scotia.....	61,397	87	61,484	48,755		110,239
New Brunswick.....	100,124	806	100,930	38,539		139,469
Quebec.....	1,591,398	151,416	1,742,814	906,633		2,649,447
Central Ontario.....	1,360,590	130,218	1,490,808	8,321,114		9,811,922
Head of Lakes.....	15,904	2,675	18,579	840,862		859,441
Total Ontario.....	1,376,494	132,893	1,509,387	9,161,976		10,671,363
Manitoba.....	2,634	2,880	5,514	13,911	140	19,565
Manitoba and Head of Lakes.....	18,538	5,555	24,093	854,773	140	879,006
Saskatchewan.....	73	12	85	1,474	227	1,786
Alberta.....		16	16	1,078	2	1,096
British Columbia.....	224	935	1,159	8,619	6,349	16,127
Yukon.....				13		13
Canada.....	3,136,350	292,712	3,429,062	10,185,224	6,718	13,621,004

Table 192.—Exports of Canadian Coal, by Destinations, 1932-1934

(Compiled in the *External Trade Branch*)

Destination	1932		1933		1934	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
BRITISH EMPIRE						
United Kingdom.....	8,575	53,811	8,918	50,585	21,158	112,653
Irish Free State.....	1,426	8,354	1,753	9,072	1,865	9,437
British South Africa.....	1,607	9,642	5,403	29,466	6,989	34,102
Bermuda.....	44	352	35	262	1,094	5,223
British West Indies—						
Barbados.....					1,235	5,623
Jamaica.....			282	2,115	200	1,500
Trinidad and Tobago.....					970	4,553
Other British West Indies.....					1,184	5,516
Gibraltar.....	439	2,634				
Newfoundland.....	87,539	466,936	79,995	389,032	102,544	470,969
Sierra Leone.....	3,525	20,250			1,111	5,187
Australia.....	13,472	98,506	23,759	152,082	22,126	135,220
New Zealand.....			2,116	11,109	5,004	22,518
Total British Empire.....	116,627	660,485	122,261	643,723	165,480	812,501
FOREIGN COUNTRIES						
Argentina.....	71	515				
Belgium.....	1,570	8,504	1,038	5,814	2,415	11,849
Brazil.....			822	4,521		
Chile.....					994	4,647
China.....	6,815	50,744	308	2,006	834	4,916
Cuba.....	1,502	9,052	443	2,497	1,896	8,890
Denmark.....	30	225				
France.....	999	5,253	1,463	8,173	5,150	25,976
French Possessions—						
French Africa.....	447	2,682				
St. Pierre and Miquelon.....	3,090	19,069	2,727	13,374	1,325	7,241
Germany.....			123	673		
Greece.....	726	4,964				
Italy.....	307	1,689	84	630		
Japan.....	3,523	26,593	3,765	16,780	1,614	7,458
Netherlands.....	2,098	11,011	891	3,932	2,394	11,739
Panama.....					1,063	4,784
Peru.....	976	6,743				
Poland and Danzig.....					305	1,449
Portuguese Africa.....			1,448	7,964		
Russia (U.S.S.R.).....					2,400	18,000
San Domingo.....					297	1,473
Spain.....	161	960			199	995
Sweden.....			406	2,233	185	925
United States.....	135,698	556,127	108,263	375,150	107,162	396,728
Alaska.....	10,847	68,420	14,583	96,710	12,622	81,407
Puerto Rico.....			608	4,045		
Total foreign countries.....	168,860	772,551	136,972	544,502	140,855	588,477
Total	285,487	1,433,036	259,233	1,188,225	306,335	1,400,978

Table 193.—Annual Consumption of Coal in Canada, 1925-1934

Calendar year	Canadian*		Imported coal "entered for consumption"				Total	Per capita
			From U.S.A.	From Great Britain	Total†			
	Short tons	%	Short tons	Short tons	Short tons	%	Short tons	
1925.....	12,125,290	42.6	15,744,957	604,117	16,331,971	57.4	28,457,261	3.062
1926.....	15,086,296	47.7	16,204,405	287,299	16,565,555	52.3	31,651,851	3.349
1927.....	15,944,983	46.7	17,266,434	907,220	18,177,303	53.3	34,122,286	3.541
1928.....	16,487,807	50.0	15,830,688	682,755	16,515,582	50.0	33,003,389	3.356
1929.....	16,387,461	48.0	16,780,452	843,502	17,724,132	52.0	34,111,593	3.402
1930.....	14,052,671	43.3	16,971,933	1,144,861	18,412,039	56.7	32,464,710	3.181
1931.....	11,682,779	47.7	11,793,798	987,442	12,828,327	52.3	24,511,106	2.362
1932.....	11,212,701	49.0	9,889,866	1,727,716	11,654,492	51.0	22,867,193	2.177
1933.....	11,456,273	51.5	8,865,935	1,942,875	10,808,962	48.5	22,265,235	2.085
1934.....	13,236,406	51.1	10,580,710	1,981,116	12,651,168	48.9	25,887,574	2.392

* The sum of Canadian coal mines sales, colliery consumption, coal supplied to employees, and coal used in making coke, etc., less the tonnage of coal exported.

† Includes small tonnages from countries other than Great Britain and the United States. Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ships' stores.

Table 194.—Summary Statistics for 1934—Output, Exports, Interprovincial Shipments, Imports and Coal made Available for Consumption in Canada, by Provinces

Province	Canadian coal				Im-ported from U.S.A.	Im-ported from Great Britain	Im-ported from Germany	Im-ported from Belgium	Im-ported from Newfoundland	Im-ported from other countries	Coal available for consumption
	Output	Re-ceived from other prov.	Shipped to other prov.	Ex-ported							
PRINCE EDWARD ISLAND—											
Anthracite.....					1,153	9,557					10,710
Bituminous.....		75,688			99	1,992			24		77,803
Total.....		75,688			1,252	11,549			24		88,513
NOVA SCOTIA—											
Anthracite.....					11,677	54,962					66,639
Bituminous.....	6,341,625	165	3,333,420	169,972	678	51,719					2,890,795
Total.....	6,341,625	165	3,333,420	169,972	12,355	106,681					2,957,434
NEW BRUNSWICK—											
Anthracite.....					22,616	79,134					101,750
Bituminous.....	314,750	365,153	13,793	42,128	23,020	12,789					659,791
Total.....	314,750	365,153	13,793	42,128	45,636	91,923					761,541
QUEBEC—											
Anthracite.....					408,915	1,467,416	72,103	17,557	6		1,965,997
Bituminous.....		2,884,609		50	659,566	263,357	50			295	3,807,827
Sub-bituminous..											
Total.....		2,884,609		50	1,068,481	1,730,773	72,153	17,557	6	295	5,773,824
CENTRAL ONTARIO—											
Anthracite.....					1,345,746	32,165					1,377,911
Bituminous.....		26,162		1	8,509,228						8,535,389
Sub-bituminous..		*20,357									21,357
Lignite.....		*32,392									32,392
Total.....		78,911		1	9,854,974	32,165					9,966,049
MANITOBA AND HEAD OF LAKES—											
Anthracite.....					14,020						14,020
Bituminous.....		213,054		51	744,390	1,506					958,899
Sub-bituminous..		70,980									70,980
Lignite.....	4,113	586,512		1,383	253						589,495
Total.....	4,113	870,546		1,434	758,663	1,506					1,633,394
SASKATCHEWAN—											
Anthracite.....											
Bituminous.....		74,567		29	1,123	112					75,773
Sub-bituminous..		14,165									14,165
Lignite.....	909,288	913,037	381,368	3,925	42						1,437,074
Total.....	909,288	1,001,769	381,368	3,954	1,165	112					1,527,012
ALBERTA—											
Anthracite.....											
Bituminous.....	1,915,800	10,616	227,262	349	1,302						1,700,107
Sub-bituminous..	537,508		132,703								404,805
Lignite.....	2,300,502		1,204,472	1,014	10						1,095,026
Total.....	4,753,810	10,616	1,564,437	1,363	1,312						3,199,938
BRITISH COLUMBIA—											
Anthracite.....						282					282
Bituminous.....	1,485,969	42,899	118,438	82,290	1,928	42				300	1,330,410
Sub-bituminous..		27,170									27,170
Lignite.....		53,899		5,127	2,486						51,258
Total.....	1,485,969	123,968	118,438	87,417	4,414	324				300	1,409,120
YUKON—											
Bituminous.....	638			16	37						659
Total.....	638			16	37						659
NORTHWEST TERRITORIES—											
Sub-bituminous..		31									31
Total.....		31									31
CANADA—											
Anthracite.....					1,804,127	1,643,516	72,103	17,557	6		3,537,309
Bituminous.....	10,058,782	3,692,913	3,692,913	294,886	9,941,371	331,517	50		24	595	20,037,453
Sub-bituminous..	537,508	132,703	132,703								537,508
Lignite.....	3,213,903	1,585,840	1,585,840	11,449	2,791						3,205,245
Total.....	13,810,193	5,411,456	5,411,456	306,335	11,748,289	1,975,033	72,153	17,557	30	595	27,317,515

* Shipments to any point in Ontario from western mines.

Table 195.—World Production of Coal* 1930-1934

(Including brown coal)
(Long tons)

Country	1930	1931	1932	1933	1934
BRITISH EMPIRE					
Great Britain—					
Anthracite.....	6,400,705	5,829,175	6,616,972	7,053,043	7,128,123
Bituminous.....	237,481,119	213,629,776	202,116,168	200,059,200	213,599,565
Irish Free State—					
Anthracite.....	†	73,393	64,506	86,246	89,731
Semi-bituminous.....	†	18,347	16,674	19,041	21,343
Nigeria.....	347,842	327,681	252,485	235,133	259,754
Southern Rhodesia.....	923,915	577,983	431,183	476,340	632,790
Union of South Africa.....	12,029,529	10,709,114	9,764,425	10,545,197	12,002,100
Canada—					
Bituminous.....	9,665,035	7,911,929	6,887,749	7,124,360	8,981,055
Sub-bituminous.....	538,713	420,842	500,805	494,748	479,918
Lignite.....	3,083,149	2,598,668	3,092,618	3,008,878	2,869,556
British Borneo—					
State of North Borneo.....	58,491	28,926	168	78	28
Sarawak.....	14,680	18,213			†
Federated Malay States.....	565,573	402,355	277,848	218,247	321,461
India—					
Gondwana Coalfields.....	23,342,372	21,331,872	19,814,524	19,456,254	21,691,404
Tertiary Coalfields.....	460,676	384,563	338,863	332,909	366,043
Used by mines.....	†	543,000	504,000	495,060	†
Australia.....	9,531,359	8,401,260	8,585,858	9,091,976	9,353,714
Lignite.....	1,831,507	2,194,453	2,612,512	2,580,060	2,617,534
New Zealand—					
Bituminous.....	1,382,875	979,636	928,234	843,845	831,702
Brown coal.....	1,046,677	1,069,749	806,397	860,238	1,103,968
Lignite.....	112,540	108,371	107,391	117,175	124,645
Total British Empire.....	309,000,000	278,000,000	264,000,000	263,000,000	283,000,000
FOREIGN COUNTRIES					
Albania—					
Lignite.....	4,215	3,109	†	†	†
Austria—					
Bituminous.....	212,478	224,541	217,819	235,150	246,861
Brown coal.....	3,014,605	2,934,978	3,055,021	2,966,862	2,805,905
Belgium—					
Anthracite and semi-anthracite.....	5,710,956	5,865,653	4,656,753	5,246,607	5,731,792
Bituminous.....	21,270,796	20,749,689	16,428,442	19,653,598	20,240,618
Bulgaria—					
Anthracite.....	2,303	6,117	3,075	3,465	6,812
Bituminous.....	62,312	78,161	93,758	75,184	70,731
Lignite.....	1,498,345	1,414,217	1,636,501	1,469,896	1,543,192
Czechoslovakia—					
Bituminous.....	14,207,021	12,895,773	10,877,907	10,365,655	10,518,684
Brown coal.....	18,890,532	17,648,430	15,607,935	14,825,194	14,932,486
France—					
Saar.....	13,026,730	11,187,485	10,273,195	10,394,373	11,138,953
Other districts—					
Anthracite and bituminous (a).....	53,049,020	49,220,890	45,535,513	46,113,162	47,870,065
Lignite.....	1,138,235	1,018,575	995,761	1,071,102	1,014,325
Germany—					
Bituminous.....	140,444,006	116,766,357	103,086,309	107,959,643	122,884,578
Lignite.....	143,704,018	131,205,263	120,709,596	124,791,923	135,105,863
Greece—					
Lignite.....	127,576	103,546	135,410	97,496	†
Hungary—					
Bituminous.....	798,731	764,150	880,674	787,418	744,315
Brown coal.....	5,746,586	5,650,352	5,395,064	5,393,595	5,661,394
Lignite.....	332,348	364,451	442,726	420,348	420,101
Lignite (anhydrous).....			115,203		113,526
Italy—					
Anthracite.....	19,530	15,331	47,004	66,644	83,212
Bituminous.....	207,946	216,640	204,390	262,439	284,481
Brown coal.....	567,750	358,730	370,107	376,712	402,162
Jugoslavia—					
Bituminous.....	360,430	399,914	362,187	377,432	381,098
Brown coal.....	3,748,858	3,467,492	3,030,987	2,806,202	2,942,596
Lignite.....	1,077,869	1,040,425	1,010,853	905,274	921,520
Netherlands—					
Bituminous.....	12,018,229	12,697,631	12,554,978	12,375,372	12,145,975
Brown coal.....	141,873	120,269	122,115	95,511	91,032
Poland—					
Bituminous.....	36,914,000	37,660,667	28,379,163	26,924,235	28,771,390
Brown coal.....	54,000	38,800	32,900	32,963	25,986
Portugal—					
Anthracite.....	183,471		187,632	205,399	195,906
Bituminous.....	27,345	223,475	49,753	19,426	3,652
Brown coal.....	33,928		16,043	11,291	14,835
Roumania—					
Anthracite.....			12,052	17,777	
Bituminous.....	294,105	282,005	172,992	173,986	223,641
Lignite.....	2,038,348	1,606,088	1,440,807	1,292,878	1,585,420

Table 195.—World Production of Coal* 1930-1934—Concluded

(Including brown coal)

(Long tons)

Country	1930	1931	1932	1933	1934
Russia—					
Anthracite.....	47,635,600	55,737,000	63,299,000	71,097,000	92,023,000
Bituminous—					
European.....					
Asiatic.....					
Brown coal.....					
Spain—					
Anthracite.....	515,306	516,402	539,110	563,399	634,440
Bituminous.....	6,492,054	6,462,526	6,203,607	5,340,855	5,203,891
Brown coal.....	381,904	336,073	330,981	296,260	293,926
Spitzbergen and Bear Island.....	185,443	239,267	261,500	364,000	501,000
Sweden.....	391,675	337,777	327,816	343,410	408,668
Switzerland (b).....	4,000	4,000	4,000	4,000	4,000
Algeria.....	16,922	25,186	24,584	29,948	33,465
Belgian Congo.....	131,700	84,359	17,000	413	4,622
Morocco (French)—					
Anthracite.....	965	5,574	14,724	26,848	36,501
Mozambique.....	†	†	19,430	15,600	21,524
Greenland.....	4,700	4,600	†	†	†
Mexico.....	1,273,818	970,723	642,314	556,144	620,000
United States—					
Anthracite.....	61,950,747	53,255,046	44,513,590	44,233,343	51,237,000
Bituminous and lignite.....	417,434,196	341,151,246	276,526,671	297,884,404	320,864,305
Brazil.....	359,673	454,061	499,170	560,918	612,331
Chile.....	1,419,367	1,083,004	1,063,027	1,512,241	1,775,291
Colombia (estimated).....	200,000	200,000	200,000	200,000	200,000
Peru.....	196,855	138,332	25,416	29,600	34,763
Venezuela (c).....	12,360	3,000	4,644	4,862	†
China (d).....	26,037,000	17,741,573	18,370,000	19,143,000	†
Dutch East Indies.....	1,841,278	1,382,223	1,033,712	1,018,881	1,015,442
Formosa.....	1,573,478	1,399,093	1,333,595	1,315,000	1,355,000
French Indo-China—					
Anthracite.....	1,860,000	1,650,000	1,640,637	1,517,861	1,530,025
Bituminous.....	47,000	28,000	22,328	25,508	36,620
Brown coal.....	28,000	23,000	23,091	22,644	
Japan—					
Semi-anthracite.....	30,880,669	27,545,251	27,610,211	32,010,079	35,357,604
Bituminous.....					
Brown coal.....					
Karafuto.....	126,593	115,881	106,818	113,958	122,815
Korea.....	634,788	637,886	666,691	874,874	1,177,748
Philippine Islands.....					
Anthracite.....	870,174	904,000	1,086,755	729,511	966,855
Bituminous.....				556,585	695,122
"Manchoukuo".....				9,005,000	†
Turkey in Asia—	20,423	18,668	18,184	15,668	†
Bituminous.....	1,569,966	1,549,230	1,568,411	1,830,607	2,252,130
Lignite.....	9,241	7,652	13,346	29,094	39,516
New Caledonia.....	9,517	†	†	†	†
Total Foreign countries.....	1,080,000,000	960,000,000	850,000,000	890,000,000	970,000,000
Grand Total.....	1,390,000,000	1,240,000,000	1,110,000,000	1,150,000,000	1,250,000,000

* Data obtained from *The Mineral Industry of the British Empire and Foreign Countries*.

† Information not available.

(a) Includes about 5,900,000 tons of anthracite each year.

(b) United States Bureau of Mines estimate.

(c) Excluding production in government owned mines.

(d) Of which about 3,000,000 tons are anthracite and 300,000 tons are lignite.

THE COKE AND ARTIFICIAL GAS INDUSTRY

Forty-one coke and gas plants, with total fixed and current assets of \$99,297,395, were in operation in Canada during 1934. These plants employed on the average 4,278 salaried employees and wage-earners who received a total remuneration of \$5,648,969.

The output of gas-house, by-product and beehive coke in Canada during 1934 totalled 2,243,420 tons as compared with 1,772,164 tons in 1933 and 1,637,701 tons in 1932. Production by the by-product coke plants and the two beehive oven plants amounted to 1,948,294 tons; the city gas plants produced only 295,126 tons. In addition, 61,760 tons of petroleum coke were recovered as a by-product in petroleum refining; this production has not been included in the coke figures given for the coke and gas industry.

Production of artificial gas amounted to 40,125,201 thousand cubic feet of which 31,755,936 thousand cubic feet were obtained from by-product coke ovens and 8,369,265 thousand cubic feet from other plants. Sales of gas by the producers totalled 15,409,927 thousand cubic feet

valued at \$15,766,750 of which 7,890,488 thousand cubic feet valued at \$7,622,449 were from by-product plants and 7,519,439 thousand cubic feet at \$8,144,301, from gas works. Most of the remaining gas was used as a fuel, in the producing plants or their associated metallurgical works. In addition to the above, 3,768,886 thousand cubic feet of still gas were produced as a by-product from petroleum refineries, practically all of which was used for fuel purposes in the refineries.

Imports of gas-house and by-product coke rose to 930,221 tons in 1934 from 644,075 tons in 1933 while exports during the same period declined to 1,137 tons from 5,199 tons. Mixed gas imported into Canada by pipe line advanced to 107,171 thousand cubic feet from 100,854 thousand cubic feet imported in the previous year.

The number of customers served by the producers of illuminating and fuel gas in 1934 was 514,907; the number of active meters was 511,360 and the length of distributing mains was 3,821 lineal miles or 6,296 miles in terms of 3-inch mains. The calorific value of the gas sold ranged from 450 to 550 B.T.U. per cubic foot.

Table 196.—Materials used in the Coke and Gas Industry in Canada, 1932-1934

Materials	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
Bituminous coal:—		\$		\$		\$
Canadian..... tons	449,264	2,175,573	604,017	2,491,991	844,303	3,459,633
Foreign..... tons	1,767,748	8,134,302	1,861,944	8,405,030	2,271,801	10,270,998
Coke for gas-making:—						
Purchased..... tons	4,507	42,225	4,614	43,343	4,457	42,596
Companies' own make..... tons	118,338	854,525	108,654	732,662	77,255	530,351
Oil used for enriching water gas..... imp. gal.	9,849,710	580,816	9,558,945	610,147	6,140,084	355,953
Oil used for making oil gas..... imp. gal.	1,796,878	109,522	756,410	56,546	866,905	68,424
Absorbing and wash oil..... imp. gal.	135,816	14,284	261,583	33,796	182,417	25,080
Caustic soda..... lb.	201,981	6,499	384,452	12,643	678,006	19,515
Calcium carbide..... lb.	40,000	1,691	28,000	1,236	.....	.....
Lime..... tons	691	5,728	1,374	8,784	1,911	11,686
Water.....	.....	16,197	.....	15,672	.....	33,484
Oxide or purifying materials..... tons	3,736	35,284	2,734	29,076	3,757	47,010
Sulphuric acid, 66° Bé..... lb.	19,062,397	124,787	28,905,528	187,420	33,907,546	238,148
All other materials.....	.....	140,255	.....	100,729	.....	134,153
Total cost.....		12,241,698		12,729,075		15,237,031

Table 197.—Production in Canada, Imports and Exports of Coke and Its By-Products, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
Coke		\$		\$		\$
PRODUCTION—by provinces—						
Nova Scotia, New Brunswick and Quebec..... tons	403,330	3,115,737	445,755	2,840,433	654,305	4,369,150
Ontario..... tons	1,087,122	7,876,941	1,153,509	8,429,660	1,388,709	10,200,363
Manitoba Alberta and British Columbia..... tons	147,249	1,101,827	172,900	1,196,102	200,406	1,292,244
Total..... tons	1,637,701	12,094,505	1,772,164	12,466,195	2,243,420	15,861,757
IMPORTS..... tons	651,802	.....	644,075	.....	934,833	.....
EXPORTS..... tons	15,469	114,450	5,199	36,381	7,396	45,390
AVAILABLE FOR CONSUMPTION..... tons	2,274,034	.....	2,411,040	.....	3,170,857	.....
Other products						
PRODUCTION—						
Ammonium sulphate..... tons	11,050	212,182	16,723	318,973	20,512	413,729
Gas: (a) Sales..... M cu. ft.	17,083,631	12,895,039	15,893,248	11,839,345	15,409,927	15,766,750
(b) Used in own plants..... M cu. ft.	6,274,218	1,392,273	7,166,473	1,668,524	13,636,957	1,753,926
(c) Used in associated metallurgical works..... M cu. ft.	4,300,510	686,498	6,314,165	908,697	8,542,290	1,163,000
(d) Gas otherwise accounted for, but not sold..... M cu. ft.	160,947	58,258	133,329	46,619	836,962	294,718
(e) Not accounted for..... M cu. ft.	781,796	816,696	844,609	881,654	970,684	876,824
Benzol..... imp. gal.	2,331,171	475,300	2,645,649	552,595	3,412,864	621,799
Light oils..... imp. gal.	918	184	57,925	61,250	473,412	51,347
Tar..... imp. gal.	20,176,843	1,158,506	21,292,622	1,172,797	25,840,781	1,397,413
Ammonia liquor..... pound N H ₃	1,700,152	20,352	1,607,326	18,729	1,981,728	23,371
All other products.....	.....	2,857	.....	1,597	.....	47,386
IMPORTS—						
Ammonium sulphate..... tons	13,811	280,026	4,156	100,415	11,046	245,372
Coal tar and pitch..... gal.	1,807,946	103,983	371,967	42,663	844,363	80,063
EXPORTS—						
Ammonium sulphate..... tons	38,741	701,707	62,383	1,081,392	57,704	1,144,164
Coal tar and pitch..... gal.	3,017,552	203,126	8,513,031	495,999	6,745,866	390,751

THE NATURAL GAS INDUSTRY

Natural gas production in Canada during 1934 advanced to 23,162,324 thousand cubic feet valued at \$8,759,652 from the 1933 total of 23,138,103 thousand cubic feet worth \$8,712,234.

Alberta continued to be the leading producing province with an output of 14,841,491 thousand cubic feet; Ontario came next with 7,682,851 thousand cubic feet; New Brunswick followed with 623,601 thousand cubic feet, and Saskatchewan entered the list of natural gas producers with a production of 13,781 thousand cubic feet. Manitoba, as usual, recorded a small output from several private wells.

Wells in the Stony Creek field, near Moncton, are the source of New Brunswick's natural gas supply. This gas is piped to Moncton and Hillsboro where approximately 5,400 consumers are served. Thirty natural gas wells were in operation in New Brunswick at the end of 1934; two wells were abandoned during the year and one new producer was drilled.

The Canadian Seaboard Oil and Gas, Ltd., completed a deep test in 1934 on lot 300, Parish of Saint-Gregoire, in Nicolet county, Quebec. According to a provincial government report, this well was spudded in some time in February and reached a depth of 6,030 feet in October when it was plugged and abandoned. Eight gas horizons were encountered in the course of drilling, but none of these proved of economic importance.

The Cartier Natural Gas Company drilled two wells in 1934. One in the Parish of Lanoraie, Berthier county, had reached 2,000 feet at the end of the year and the other in the Parish of Saint Hubert, Chambly county, was at a depth of 3,200 feet on December 31st. According to the provincial government's records another well was drilled in Lanorie Parish by Carl M. Mohr; this well struck a flow of gas, estimated at 15,000 cubic feet per day, at a depth of 1,206 feet, but on deepening to 1,390 feet, a heavy flow of highly saline water was encountered. This water was shut off with a lead plug and the well remains with a valve at the casinghead to seal off the gas.

Ontario's production advanced 7.2 per cent in 1934 to 7,682,851 thousand cubic feet from the preceding year's total of 7,166,659 thousand cubic feet.

Col. R. B. Harkness, Commissioner of Gas for Ontario, reports that 1934 was the outstanding year in new production since the years 1910 to 1914, when the Tilbury field reached its peak of development.

Consumption of natural gas in the city of Medicine Hat, Alberta totalled 1,914,606 thousand cubic feet as compared with 2,149,535 thousand cubic feet in 1933. About 2,500 consumers were supplied with gas from the Medicine Hat field in 1934. Wells in the Redcliff field, about two miles west of Medicine Hat, supplied gas to approximately 300 industrial and domestic consumers.

The Viking field, which is approximately 80 miles southeast of Edmonton, was the source of supply for over 10,000 consumers within that city. Outside of Edmonton some 500 consumers were furnished with gas from the Viking field.

The Maple Leaf well, in the Fabyan field, supplied gas to 300 users in Wainwright.

At the close of the year 92 wells were producing gas in Alberta as compared with 87 wells a year ago. The capital employed by companies operating in this industry in Alberta amounted to \$26,101,630. During the year, 377 employees receiving salaries and wages totalling \$496,979 were employed by Alberta producers.

Mixed gas (natural and artificial) imported into Canada from the United States during 1934 reached a total of 107,171 thousand cubic feet valued at \$69,734 as against 100,854 thousand cubic feet worth \$73,435 imported in 1933.

The 198 firms operating in the Canadian natural gas industry during 1934 reported a capital investment of \$70,767,123. On an average, 1,553 salaried employees and wage-earners were employed in this industry in 1934; salaries and wages paid to these employees totalled \$1,789,811. Fuel and electricity used during the year cost the operators \$67,341.

Table 198.—Production of Natural Gas in Canada, by Provinces, 1925-1934

(For the years 1892 to 1924 see Mineral Production of Canada, 1928)

Year	New Brunswick		Ontario		Manitoba		Alberta		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$		\$
1925.....	639,235	122,394	7,143,962	3,958,006	200	60	9,119,500	2,752,545	16,902,897	6,833,005
1926.....	648,316	128,300	7,764,996	4,409,593	200	60	10,794,697	3,019,221	19,208,209	7,557,174
1927.....	630,755	124,637	7,311,215	4,331,780	200	60	13,434,621	3,586,533	21,376,791	8,043,010
1928.....	660,981	324,344	7,632,800	4,535,312	200	60	14,288,605	3,754,466	22,582,586	8,614,182
1929.....	678,459	333,002	8,586,475	4,959,695	600	180	19,112,931	4,684,247	28,378,462	9,977,124
1930.....	661,975	325,751	7,965,761	5,034,828	600	180	20,748,583	4,929,226	29,376,919	10,289,985
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,067,893	25,874,723	9,026,754
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794	23,420,174	8,899,462
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263	23,138,103	8,712,232
1934.....	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276	(a) 23,162,324	(a) 8,759,652

(a) Includes production in Saskatchewan.

Table 199.—Production of Natural Gas in Canada, by Months, 1934

Month	New Brunswick	Ontario	(a) Manitoba	Saskatchewan	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	88,903	920,832	50		2,120,290	3,120,075
February.....	83,426	1,056,820	50		1,730,511	2,870,807
March.....	78,014	932,088	50		1,748,179	2,758,331
April.....	68,582	882,399	50		1,369,292	2,320,323
May.....	47,880	547,782	50		938,048	1,533,760
June.....	37,934	416,049	50		759,196	1,213,259
July.....	25,490	332,593	50		651,047	1,009,130
August.....	20,883	307,461	50		623,992	952,356
September.....	24,233	376,226	50		844,174	1,244,683
October.....	34,131	503,298	50	1,753	985,543	1,524,775
November.....	52,455	684,621	50	4,867	1,313,495	2,055,488
December.....	61,640	722,682	50	7,161	1,757,724	2,549,257
Total.....	623,601	7,682,851	600	13,781	14,841,491	23,162,324

(a) Estimated.

Table 200.—Natural Gas Production in Ontario, by Fields, 1933 and 1934 (a)

County	Fields	1933	1934
		M cu. ft.	M cu. ft.
Kent, including Kingsville.....	Tilbury and Kingsville.....	4,201,704	4,093,186
Kent.....	Dover.....	252,694	363,344
Lambton.....	Dawn and Oil Springs.....	265,061	517,009
Elgin.....	Bayham.....	45,968	51,483
Norfolk.....	Norfolk.....	346,621	354,274
Lincoln.....	Lincoln.....		
Haldimand.....	Haldimand.....	1,524,251	1,801,160
Wentworth.....	Wentworth.....		
Brant.....	Onondaga.....	121,578	109,486
Bruce.....	Amabel.....	500	500
Welland.....	Welland.....	333,619	318,409
Wells in surface drift.....	Howard and Sarnia.....	14,663	14,000
Private wells.....		60,000	60,000
Total produced.....		7,166,659	7,682,851
Value.....		\$ 4,523,084	4,741,368
Imported mixed gas.....	M cu. ft.	97,075	102,667
Total distributed.....	M cu. ft.	7,263,734	7,785,518

(a) Prepared by the Ontario Department of Mines.

Table 201.—Number of Gas Wells in Canada, by Provinces, 1932-1934

		New Brunswick	Ontario	Manitoba	Saskat- chewan	Alberta	Canada
Productive wells at beginning of year.....	1932	28	2,266	6	.....	90	2,390
	1933	30	2,620	6	.....	89	2,745
	1934	31	2,708	6	.....	87	2,832
Number of productive wells drilled.....	1932	2	151	.....	.....	4	157
	1933	1	173	.....	.....	.....	174
	1934	1	217	.....	1	1	220
Number of dry wells drilled.....	1932	2	32	.....	.....	.....	34
	1933	2	67	.....	.....	.....	69
	1934	.....	77	1	2	.....	(a) 81
Number of wells abandoned.....	1932	.....	42	.....	.....	3	45
	1933	.....	55	.....	.....	.....	55
	1934	2	60	.....	.....	.....	62
Productive wells at end of year.....	1932	30	2,620	6	.....	89	2,745
	1933	31	2,708	6	.....	87	2,832
	1934	30	2,869	6	1	92	2,998

(a) Includes one dry well drilled in Quebec.

Table 202.—Natural Gas Wells in Ontario, by Townships, 1933 and 1934

Township	1933				1934			
	No. of producing wells in operation Dec. 31, 1933	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1934	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Aldborough.....	.....	.....	.....	.....	.....	.....	1	.....
Amabel.....	2	.....	.....	.....	2	.....	1	.....
Ancaster.....	.....	.....	.....	.....	.....	.....	.....	1
Bayham.....	35	.....	.....	.....	38	.....	2	4
Bertie.....	95	.....	.....	5	99	1	.....	4
Binbrook.....	53	1	.....	.....	53	1	.....	1
Caistor.....	53	1	.....	.....	60	2	.....	3
Canboro.....	168	4	2	9	181	3	1	16
Caledon, East.....	.....	.....	.....	.....	.....	1	.....	.....
Cayuga, North.....	154	3	2	12	173	.....	4	18
Cayuga, South.....	53	2	.....	.....	54	.....	1	1
Charlotteville.....	13	.....	.....	.....	13	.....	.....	.....
Chatham Gore.....	.....	.....	1	.....	.....	.....	.....	.....
Chinguacousy.....	.....	.....	.....	.....	.....	.....	1	.....
Crowland.....	32	12	.....	.....	25	7	.....	.....
Dawn.....	15	.....	1	3	15	.....	4	1
Dover, East.....	8	.....	.....	.....	12	.....	2	3
Dover, West.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunn.....	49	.....	7	21	52	5	1	7
Ekfrid.....	.....	.....	1	.....	.....	.....	.....	.....
Enniskillen.....	4	.....	.....	.....	4	.....	.....	.....
Euphemia.....	1	.....	.....	.....	.....	3	.....	.....
Gainsboro.....	5	.....	.....	.....	13	.....	5	10
Gosford.....	11	.....	.....	.....	11	.....	.....	.....
Gosfield.....	16	.....	.....	1	17	.....	1	1
Houghton.....	7	.....	.....	.....	5	2	.....	.....
Humberstone.....	62	4	.....	.....	60	2	.....	.....
Maidstone.....	.....	.....	1	.....	.....	.....	.....	.....
Malahide.....	.....	.....	.....	.....	1	.....	.....	.....
Mersea.....	3	.....	.....	.....	3	.....	.....	.....
Middleton.....	38	2	4	4	44	.....	2	7
Moulton.....	106	6	3	14	112	3	1	13
Oneida.....	50	2	2	4	59	1	4	8
Onondaga.....	39	.....	.....	.....	39	9	2	8
Orford.....	.....	.....	2	.....	.....	.....	.....	.....
Puslinch.....	1	.....	.....	.....	.....	.....	.....	.....
Rainham.....	269	.....	10	22	276	1	2	8
Raleigh.....	32	4	.....	1	32	1	3	5
Romney.....	142	1	.....	.....	140	1	.....	.....
Sarnia.....	13	.....	.....	.....	13	.....	.....	.....
Seneca.....	169	11	6	5	174	12	2	19
Sherbrooke.....	13	.....	.....	.....	13	.....	.....	.....
Sombra.....	.....	.....	.....	.....	.....	.....	3	.....
Tilbury, East.....	143	1	1	7	144	.....	.....	3
Townsend.....	1	.....	.....	.....	2	.....	.....	1
Tuscarora.....	64	.....	2	7	74	1	.....	11
Wainfleet.....	26	2	.....	1	27	.....	.....	.....
Walpole.....	270	2	14	50	323	1	29	55
Walsingham, N.....	10	.....	.....	1	14	.....	.....	.....
Walsingham, S.....	14	.....	.....	1	12	.....	.....	1
Windham.....	8	.....	.....	.....	10	.....	1	2
Willoughby.....	41	.....	2	4	42	3	2	2
Woodhouse.....	55	1	1	.....	59	.....	1	4
Private wells.....	296	.....	.....	.....	300	.....	.....	.....
Surface wells.....	69	.....	.....	.....	69	.....	.....	.....
Total.....	2,708	55	67	173	2,869	60	77	217

Table 203.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1933 and 1934

	1933				1934			
	Quebec	Ontario	Alberta	Canada	Quebec	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—								
Cost of lands, buildings, plant, machinery and tools.....	73,729	39,458,882	25,263,517	64,796,128	38,000	35,557,607	24,433,232	60,028,839
Cost of supplies and stock on hand.....		470,435	213,750	684,185		425,307	166,200	591,507
Cash, trading and operating accounts and bills receivable.....	50,000	11,814,877	1,801,798	13,666,675		6,821,544	1,502,198	8,323,742
Total.....	123,729	51,744,194	27,279,065	*80,937,170	38,000	42,804,458	26,101,630	†70,767,123

* Includes data for New Brunswick and Saskatchewan.

† Includes data for New Brunswick, Manitoba and Saskatchewan.

Table 204.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1933 and 1934

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1933					\$	\$	\$
New Brunswick.....	13	5	53	71	35,330	61,844	97,174
Quebec.....	1		11	12	4,080	15,345	19,425
Ontario.....	373	96	471	940	616,260	405,396	1,021,656
Saskatchewan.....	1		3	4	150	4,495	4,645
Alberta.....	76	23	241	340	162,132	345,783	507,915
Canada.....	464	124	779	1,367	817,952	832,863	1,650,815
1934							
New Brunswick.....	14	6	51	71	36,102	65,383	101,485
Quebec.....	1		11	12	3,800	19,605	23,405
Ontario.....	382	104	588	1,074	632,237	515,337	1,147,574
Manitoba.....			1	1		1,802	1,802
Saskatchewan.....	1		17	18	400	18,166	18,566
Alberta.....	87	25	265	377	169,520	327,459	496,979
Canada.....	485	135	933	1,553	842,059	947,752	1,789,811

* See footnote on page 26.

THE PEAT INDUSTRY

The Canadian production of peat for use as fuel in 1934 amounted to 1,878 tons valued at \$7,343 as compared with 1,131 tons worth \$3,449 produced in 1933. The 1934 output was obtained from Winchester, Ellice, and Elma townships, Ontario.

Table 205.—Production of Peat in Canada, 1924-1934

Year	Tons	Value
		\$
1924.....		
1925.....	1,370	8,394
1926-27.....		
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products.

1. Production of Crude Petroleum

The Canadian production of crude petroleum during 1934 totalled 1,410,895 barrels or 23·2 per cent above the output in the preceding year. The 1934 production consisted of 11,106 barrels from New Brunswick, 141,385 barrels from Ontario, 1,253,966 barrels from Alberta and 4,438 barrels from the Northwest Territories.

Alberta wells produced 1,253,966 barrels as compared with 995,832 barrels in 1933. During the year under review the Turner Valley field produced 1,220,862 barrels of crude naphtha and light crude oil, the Red Coulee and Keho fields, 20,854 barrels, and the Wainwright and Skiff fields, 12,250 barrels. One hundred and twenty-two wells were in operation in Alberta at the close of 1934 and drilling was in progress on eighteen other wells in the Turner Valley, Skiff, Pekisko, Cardston, Hunter Valley and Watson Structure fields. Eight new wells were brought into production during the year. Approximately 72,000 feet of drilling was done in 1934 compared with 19,000 feet in the preceding year and 190,125 feet in 1930. Alberta operators reported the use of 128,830 feet of casing weighing 2,838 tons in 1934; during the previous year 36,937 feet of casing weighing 726 tons were used. Casing used in 1934 was valued at \$252,710 as compared with the 1933 valuation of \$59,475 and the 1931 total of \$369,734.

Crude naphtha and oil prices to Alberta producers in 1934, as quoted in the Western Oil Examiner, were as follows:—

	To March 6	To May 21	From May 21
Crude naphtha.....	\$3·15	\$2·87	\$2·55
Discoloured.....	2·91	2·63	2·31
Crude oil, 50° up.....	2·66	2·44	2·19
Crude oil, 45° to 49·9°.....	2·07	2·07	2·07
Crude oil, 40° to 44·9°.....	1·50	1·50	1·50

Two natural gasoline absorption plants, owned by the Royalite Oil Company, Ltd., and the Gas and Oil Products Ltd., respectively, were in operation in the Turner Valley field during the year. The latter company's plant, which is located in South Turner Valley, was completed in September.

Crude petroleum production in Ontario has shown a steady increase during the past four years and the average price per barrel has shown a decided improvement during the same period. In 1934 the output amounted to 141,385 barrels averaging \$2.12 per barrel as compared with 136,058 barrels with an average of \$1.86 in 1933 and 117,302 barrels worth \$2.01 per barrel in 1930.

"The increase in production during 1934 was mostly in the old portion of the Bothwell field where wells drilled 70 years ago and idle for 30 years, have been cleared out and rejuvenated. These wells are north and south of the Thames river in Zone, Aldborough, Orford and Mosa townships where the four townships find a common corner. In addition to these old wells, some new wells have been drilled with favourable results. Although this new production can scarcely be considered as permanent, as a new field the results have been better than in many of the recent producing areas, most of which gave a high initial production but became exhausted in 30 to 90 days.

"The major drilling activity was in Brooke township where a producing well was drilled late in 1933 on the Acheson farm, Lot 23, Concession XIII. Development spread eastward through Concessions XI, XII, XIII and XIV to the township of Metcalfe, where two dry holes were drilled years ago." (1)

(1) From a report by Col. R. B. Harkness, Commissioner of Gas for Ontario.

Eleven producing wells and 12 dry wells were drilled in the search for oil in Ontario during 1934. Approximately 11,000 feet were drilled during the year as compared with 5,213 feet in 1933. One hundred and two wells were abandoned in 1934. At the end of the year 2,066 wells were in operation as against 2,151 wells active on January 1st.

Production from New Brunswick wells rose to 11,106 barrels in 1934 from the 1933 total of 8,835 barrels. As usual, this oil was obtained from wells in the Stony Creek field near Moncton. The crude oil was treated in a small topping plant at Weldon, and gasoline and fuel oil were recovered.

Discovery Nos. 1 and 2 wells near Fort Norman, Northwest Territories, were operated in 1934 and produced 4,438 barrels; in 1933 these wells produced 4,608 barrels. This oil, which ranged from 38° to 41° Bé, was treated at a small refinery near Fort Norman and a considerable part of the gasoline and fuel oil produced was used in connection with mining operations in the Great Bear Lake area.

Capital employed by companies operating and drilling oil wells in Canada during 1934 amounted to \$35,408,801. This industry furnished employment to 944 salaried employees and wage-earners who received a remuneration of \$1,072,617. Fuel and electricity used during the year cost the operators \$168,338.

Table 206.—Production of Crude Petroleum in Canada, by Provinces, 1925-1934

(For the years 1881 to 1924 see Mineral Production of Canada, 1928.)

(Barrel=35 Imp. gal.)

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$		\$		\$
1925.....	5,376	18,756	143,134	386,555	183,491	845,394			332,001	1,250,705
1926.....	10,544	29,940	137,850	379,221	216,050	902,504			364,444	1,311,665
1927.....	18,244	41,748	139,606	288,347	318,741	1,185,948			476,591	1,516,043
1928.....	8,043	21,391	134,094	249,737	482,047	1,764,172			624,184	2,035,300
1929.....	7,499	19,909	121,194	253,678	988,675	3,458,177			1,117,368	3,731,764
1930.....	6,758	17,378	117,302	235,746	1,398,160	4,780,696			1,522,220	5,033,820
1931.....	6,577	15,461	122,365	219,993	1,413,631	3,976,220			1,542,573	4,211,674
1932.....	6,408	14,332	130,343	247,468	906,751	2,751,541	910	9,251	1,044,412	3,022,592
1933.....	8,835	18,111	136,058	253,486	995,832	2,844,157	4,608	23,037	1,145,333	3,138,791
1934.....	11,106	22,277	141,385	299,874	1,253,966	3,104,823	4,438	22,188	1,410,895	3,449,162

Table 207.—Production of Crude Petroleum in Canada, by Months, 1934

(Barrel=35 Imp. gal.)

	New Brunswick	Ontario	Alberta	Northwest Territories	Canada
	Barrels	Barrels	Barrels	Barrels	Barrels
January.....	1,529	12,119	110,716		124,364
February.....	578	9,148	106,797		116,523
March.....	972	10,307	118,728		130,007
April.....	795	11,621	106,443		118,859
May.....	839	12,223	104,598		117,660
June.....	882	12,284	95,821	1,128	110,115
July.....	1,111	11,502	108,115	1,339	122,067
August.....	687	13,053	101,011	1,160	115,911
September.....	1,065	11,097	102,038	811	115,011
October.....	845	13,947	107,231		122,023
November.....	817	13,741	98,638		113,196
December.....	986	10,343	105,804		117,133
Total.....	11,106	141,385	1,265,940	4,438	1,422,869

Table 208.—Production of Crude Petroleum in Canada, by Provinces, 1933 and 1934

Provinces	1933		1934	
	Barrels	Total value	Barrels	Total value
		\$		\$
NEW BRUNSWICK.....	8,835	18,111	11,106	22,277
ONTARIO—				
Petrolia and Enniskillen.....	57,298	106,527	57,938	121,642
Oil Springs.....	31,343	61,396	29,863	65,684
Moore Township.....	2,192	4,075	2,963	6,221
Sarnia Township.....	2,181	4,054	825	1,732
Plympton Township.....	211	392	202	424
Bothwell.....	22,935	42,633	32,133	67,463
West Dover.....	763	1,334	558	1,171
Onondaga.....	946	1,798	601	1,311
Mosa Township.....	8,168	15,183	9,031	18,961
Thamesville.....	847	1,574	614	1,289
Dawn and Euphemia.....	8,589	13,433	4,169	8,753
Raleigh.....	239	444	264	554
Brooke.....			1,941	4,075
Dunwich.....	346	643	283	594
Total for Ontario.....	136,058	253,486	141,385	299,874
ALBERTA—				
Turner Valley.....	968,055	2,816,061	1,220,862	3,065,955
Red Coulee-Border-Keho.....	23,305	23,747	20,854	28,051
Wainwright-Skiff.....	4,472	4,349	12,250	10,817
Total for Alberta.....	995,832	2,844,157	1,253,966	3,104,823
NORTHWEST TERRITORIES.....	4,608	23,037	4,438	22,188
Canada.....	1,145,333	3,138,791	1,410,895	3,449,162

Table 209.—Petroleum Wells in Canada, by Provinces, 1932-1934

		New Brunswick	Ontario	Alberta	Canada
Productive wells at beginning of year.....	1932	26	2,208	109	2,343
	1933	23	2,036	111	2,170
	1934	23	2,151	113	2,287
Number of productive wells drilled.....	1932		7	7	14
	1933		5	5	10
	1934		11	8	19
Number of wells abandoned.....	1932		159	1	160
	1933		237	2	239
	1934		102	9	111
Number of dry wells drilled.....	1932		14		14
	1933		3	1	4
	1934		12	3	15
Number of productive wells in operation at end of year.....	1932	23	2,036	111	2,170
	1933	23	2,151	113	2,287
	1934	23	2,066	122	(a) 2,213

(a) Includes 2 wells in the Northwest Territories.

Table 210.—Imports into Canada and Exports of Petroleum, Asphalt and Their Products, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
IMPORTS—						
ASPHALT AND ITS PRODUCTS		\$		\$		\$
Asphaltum, or asphalt, solid..... tons	12,532	193,912	4,462	106,586	5,015	114,951
Asphalt, not solid..... gals.		10,709		10,312	98,657	11,030
Asphaltum oil for paving purposes only.gals.		8,887		1,458	14,619	1,832

Table 210.—Imports into Canada and Exports of Petroleum, Asphalt and Their Products, 1932-34—Concluded

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
IMPORTS—(Concluded)		\$		\$		\$
CRUDE PETROLEUM, FUEL AND GAS OILS						
Crude petroleum in its natural state, .7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories.....gals.	889,838,742	26,310,278	954,392,366	20,290,580	1,072,327,425	31,907,176
Crude petroleum, gas oils other than naphtha, benzine and gasoline lighter than .8235 but not less than .775 specific gravity at 60 degrees.....gals.	306,975	13,837	60,331	3,773	181,278	9,740
Petroleum, crude, not in its natural state, .725 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories.....gals.	20,061,147	1,021,485	25,636,911	1,031,971	1,782,276	98,920
Petroleum (not including crude petroleum imported to be refined or illuminating or lubricating oils) .8235 specific gravity or heavier at 60 degrees temperature (fuel oil).....gals.	57,292,849	2,062,912	43,271,325	1,445,467	32,959,499	1,149,341
Petroleum, and other oils, imported by miners or mining companies or concerns for use in the concentration of ores of metals in their own concentrating establishments.....gals.	116,987	58,400	95,421	47,948	77,126	85,364
Fuel oil, ex-warehoused for ships stores.....gals.	32,008,998	857,490	26,896,996	723,863	23,481,946	589,843
KEROSENE AND ILLUMINATING OILS						
Coal oil and kerosene, lighter than .8235 specific gravity at 60 degrees temperature, n.o.p.....gals.	1,670,205	126,768	1,569,384	116,657	1,985,739	142,025
Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon.....gals.	2,117	890	3,658	1,585	1,062	345
Engine distillate, lighter than .8235 specific gravity at 60 degrees temperature.....gals.	63,842	6,843	64,626	6,880	132,795	12,946
LUBRICATING OILS						
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon.....gals.	7,849,532	1,460,204	6,208,152	1,160,093	6,872,364	1,047,882
Lubricating oils, n.o.p.....gals.	3,753,387	1,567,818	3,660,582	1,464,241	3,648,960	1,345,094
GASOLINE AND OTHER OILS						
Natural casinghead compression or absorption gasoline, lighter than .6690 specific gravity at 60 degrees temperature, when imported by distillers of petroleum for blending with other gasoline distilled in Canada.....gals.	26,693,969	1,530,657	39,688,271	2,545,302	48,376,014	2,593,460
Gasoline lighter than .8235 specific gravity at 60 degrees temperature.....gals.	74,859,806	7,503,705	17,122,366	1,446,766	13,205,856	1,248,497
All other oils, n.o.p.....gals.	229,589	80,093	305,985	90,768	580,667	117,509
OTHER PRODUCTS OF PETROLEUM						
Grease, axle.....lb.	3,148,868	169,484	2,417,038	130,792	3,374,842	169,183
Paraffine wax.....lb.	1,619,905	53,508	1,760,621	60,955	6,063,526	268,741
Paraffine wax candles.....lb.	309,486	58,204	165,491	32,174	146,075	28,647
Vaseline and all similar preparations of petroleum for toilet, medicinal or other purposes.....		200,084		214,539		241,063
Naphtha and products of petroleum, n.o.p., lighter than .8235 specific gravity at 60 degrees temperature.....gals.	1,884,315	176,702	1,244,930	113,627	1,868,361	142,927
Total.....		43,472,870		31,046,337		41,326,516
EXPORTS—						
Oil, petroleum, crude.....gals.	7,297,332	244,613	10,658,848	394,727	5,438	497
Oil, coal and kerosene, refined.....gals.	884,623	116,897	996,468	179,986	782,350	78,618
Oil, gasoline and naphtha.....gals.	4,209,436	585,790	4,042,959	627,851	4,757,175	528,197
Oil, mineral, n.o.p.....gals.	7,922,816	276,015	12,938,982	537,776	12,994,817	585,785
Wax, mineral.....cwt.	23,855	66,144	2,498	6,955	2,633	10,219
Total.....		1,289,459		1,747,295		1,203,316

Table 211.—World Production of Crude Petroleum

(Supplied by *Imperial Institute*)

(Long tons)

	1932	1933	1934
BRITISH EMPIRE			
United Kingdom (estimated) (c).....	119,000	118,000	119,000
Canada.....	132,204	145,432	174,047
Barbados.....	596	574	480
Trinidad (b).....	1,387,140	1,309,775	1,492,378
British Borneo (Sarawak).....	335,287	321,299	278,037
Brunei (exports).....	176,275	280,523	371,591
India (b).....	1,191,529	1,181,502	1,243,341
New Zealand.....	931	693	636
Australia (Victoria).....	80	80	23
Total.....	3,340,000	3,360,000	3,680,000
FOREIGN COUNTRIES			
Austria.....	118	842	4,113
Czechoslovakia.....	18,201	17,495	25,561
Estonia (c).....	36,017	37,617	46,137
France.....	73,441	88,654	76,613
Germany.....	226,107	234,819	309,645
Greece.....	500	(a)	(a)
Italy (c).....	28,100	26,107	20,007
Jugoslavia.....	284	498	471
Poland.....	547,894	541,976	520,849
Roumania.....	7,232,264	7,260,101	8,335,103
Russia.....	21,038,200	21,287,000	25,100,000
Spain (c).....	5,846	5,164	(a)
Algeria.....	877	551	367
Egypt.....	266,515	233,970	217,532
Morocco (French).....	266	552	547
Mexico (b).....	4,970,530	5,151,641	5,783,628
United States (b).....	106,102,600	122,385,900	122,711,486
Argentina (d).....	1,847,153	1,924,731	1,971,736
Bolivia.....	6,300	(a)	(a)
Colombia (b).....	2,312,002	1,852,975	2,441,958
Ecuador.....	280,058	231,415	234,145
Peru.....	1,381,820	1,837,673	2,124,189
Venezuela.....	16,815,380	17,020,071	20,385,588
China (c).....	327	313	(a)
Formosa (b).....	4,984	5,204	5,008
Iraq.....	113,000	113,000	1,015,195
Japan (b).....	221,282	202,549	256,757
"Manchoukuo".....	74,317	87,078	(a)
Netherlands East Indies.....	5,012,725	5,440,019	5,959,104
Iran (Persia).....	6,445,808	7,086,706	7,537,372
Total.....	175,000,000	193,000,000	205,000,000
World's Total.....	178,000,000	196,000,000	209,000,000

(a) Information not available.

(b) The following conversion rates have been used: 35 gallons=1 barrel and the undermentioned barrels=1 ton:—Mexico 6·6, Trinidad 7·3, India 7·4, United States 7·4, Colombia 7·1, Formosa 7·0, Japan 7·2.

(c) Including shale oil.

(d) Converted from cubic metres at rate of 1 cubic metre=·8843 long tons.

Table 212.—Capital Employed in the Petroleum Industry in Canada, by Provinces,* 1933 and 1934

	1933			1934		
	Ontario	Alberta	Canada	Ontario	Alberta	Canada †
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	1,291,464	29,728,185	31,019,649	1,355,498	27,330,881	28,719,653
Cost of supplies and stocks on hand.....	8,762	798,045	806,807	10,363	1,178,663	1,235,331
Cash, trading and operating accounts and bills receivable.....	9,774	5,136,298	5,146,072	12,016	5,433,440	5,453,817
Total.....	1,310,000	35,662,528	36,972,528	1,377,877	33,942,984	35,408,801

* Data for New Brunswick included in the "Natural Gas Industry".

† Includes data for the Northwest Territories.

Table 213.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,† 1933 and 1934

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1933					\$	\$	\$
Ontario.....	12		166	178	13,233	84,530	97,763
Alberta.....	79	20	441	540	181,529	494,442	675,971
Canada.....	91	20	607	718	194,762	578,972	773,734
1934							
Ontario.....	12		192	204	12,007	98,001	110,008
Alberta.....	117	31	592	740	221,650	740,959	962,609
Canada.....	129	31	784	944	233,657	838,960	1,072,617

* See footnote on page 26.

† Data for New Brunswick included in the "Natural Gas Industry".

‡ Data for the Northwest Territories included with Alberta.

Table 214.—Casing Used in the Petroleum Industry in Alberta, 1933 and 1934

Size	1933		1934		Size	1933		1934	
	Weight	Length	Weight	Length		Weight	Length	Weight	Length
Inches	Pounds	Feet	Pounds	Feet	Inches	Pounds	Feet	Pounds	Feet
4.....	22,400	1,400			13½.....	5,400	100	1,205,770	21,890
5.....			66,000	3,000	13¾.....	154,602	2,845	15,914	292
6.....			21,504	768	14.....	93,405	1,437	98,091	1,816
6½.....	201,024	5,584	147,924	5,283	15.....	26,250	350	593,640	9,117
7.....			141,260	5,045	18.....	42,875	490	48,972	634
8.....	300,770	8,790	493,632	13,712	18½.....	7,400	100	231,137	3,020
8½.....	180,288	5,008	569,389	15,817	19.....			8,229	105
9.....			131,652	3,657	20.....			46,620	518
9½.....			618,480	17,839	21.....			3,605	35
10.....	304,754	8,333	514,543	11,663	21½.....			43,449	476
10½.....	113,750	2,500	409,481	9,055	25.....			2,513	25
11.....			7,500	150					
12.....			237,786	4,583	Total....	1,452,918	36,937	5,675,571	128,830
12½.....			18,480	330					
13.....									

(2) The Petroleum Products Industry in Canada

Forty-two petroleum refineries were in operation in Canada during 1934 as follows:—10 in Alberta, 10 in Saskatchewan, 7 in Ontario, 5 in Quebec, 4 in British Columbia, 1 in Nova Scotia, 1 in New Brunswick and 1 in the Northwest Territories. The total capacity of these plants was reported at 159,400 barrels of crude oil per day. Fourteen refineries operated cracking units with a combined capacity of 74,350 barrels per day.

Capital employed in the petroleum refining industry was reported at \$66,450,496. The average number of employees was 4,876 and the payments to these workers in salaries and wages amounted to \$6,274,799. Materials used in refineries cost \$56,659,492 and products were valued at \$75,691,078.

The oil refineries used, in 1934, a total of 1,109,510,343 gallons of crude oil, of which 770,382,530 gallons were from the United States, 297,666,050 gallons from Trinidad and South American countries and 41,461,763 gallons from Canadian wells. The crude oil from the United States included 768,765,241 gallons in its natural state and 1,617,289 gallons not in its natural state. The Canadian oil included 34,304,479 gallons in its natural state and 7,157,284 gallons of naphtha and absorption gasoline which was run to the refinery stills. Shipments from other countries included 265,845,557 gallons of crude in its natural state and 31,820,493 gallons of reduced crude. The total cost at the refineries of the oil used during the year was \$53,642,101. Stocks of crude held at the refineries at the end of 1934 were reported at 103,939,321 gallons of crude in its natural state and 8,120,356 gallons not in its natural state; a total of 112,059,677 gallons.

Gasoline production in 1934 amounted to 461,753,363 gallons of which 166,773,271 gallons were made by cracking and 294,980,092 gallons by straight run. In addition, the refineries used 51,568,707 gallons of imported casinghead gasoline which were not included in the production figure; this imported gasoline was used for blending with the refinery product. Refinery stocks at the end of 1934 totalled 70,144,704 gallons including 2,919,450 gallons of imported casinghead. The value of the gasoline produced in 1934 was \$42,457,623.

Fuel oil production in 1934 totalled 353,989,989 gallons of which 53,918,147 gallons were used for fuel by the reporting refineries. Imports amounted to 56,441,445 gallons and exports were reported at only 5,438 gallons. Refinery stocks at the end of the year (excluding quantities held for pressure cracking operations) totalled 51,657,784 gallons.

Output of gas oils was reported at 102,005,336 gallons in 1934, imports at 181,278 gallons and refinery stocks at 18,296,163 gallons. Kerosene production was shown at 37,741,993 gallons, imports at 1,985,739 gallons, exports at 782,350 gallons and refinery stocks at 8,436,554 gallons.

In 1934, nine firms were engaged primarily in the compounding of lubricating oils and greases. These plants produced lubricating oils, greases, etc., valued at \$551,836; the preceding year's production was worth \$464,544. Capital employed in this industry in 1934 was recorded at \$570,545; employment was furnished during the year to 81 persons who received \$104,427 in salaries and wages.

Table 215.—Materials Used and Products Made by the Oil Refineries of Canada, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
MATERIALS USED—		\$		\$		\$
<i>Petroleum refining—</i>						
Crude oil, in its natural state from						
Canadian wells..... imp. gal.	37,340,321	3,233,136	32,404,139	2,774,379	34,304,479	2,598,824
Naphtha, absorption gasoline, etc.					7,157,284	640,074
from Canadian wells..... imp. gal.						
Crude oil in its natural state—						
(a) From the United States..... imp. gal.	892,773,734	45,494,788	688,869,955	30,835,697	768,765,241	38,165,168
(b) From other countries..... imp. gal.			322,936,756	11,729,822	265,845,557	10,140,741
Crude oil, not in its natural state—						
(a) From the United States..... imp. gal.	Included	with natural	crude		1,617,289	171,205
(b) From other countries..... imp. gal.					31,820,493	1,926,089
Sulphuric acid (66° Bé, not made by						
firm reporting..... lb.	26,653,976	266,403	24,057,138	239,016	24,696,413	250,501
Sulphur (not used in acid manufacture) lb.	62,244	2,425	67,730	2,464	117,279	4,095
Caustic soda..... lb.	3,079,814	99,852	3,291,438	104,992	3,324,029	111,870
Soda ash..... lb.	323,840	6,870	284,761	6,483	289,418	6,636
Litharge..... lb.	588,499	27,415	364,934	25,536	356,648	26,898
Fullers' earth..... lb.	19,642,179	258,934	22,811,655	314,515	18,588,514	239,357
Compounding materials.....		424,729		372,020		338,247
Tetraethyl fluid.....		408,615		1,451,453		1,249,314
Other materials.....				113,419		264,055
Shipping containers.....		1,806,304		949,170		526,418
Total.....		52,029,471		48,916,966		56,659,492
<i>Lubricating oils and greases—Total.....</i>		<i>207,916</i>		<i>270,791</i>		<i>309,523</i>
Grand total.....		52,237,387		49,187,757		56,969,015
<i>PRODUCTS MADE—</i>						
<i>Petroleum refining—</i>						
Made for sale—						
Gasoline (a) straight run.... imp. gal.	207,750,871	23,148,720	267,010,338	25,933,516	294,665,214	28,478,159
(b) by cracking process..... imp. gal.	192,113,405	19,957,260	155,843,903	13,911,439	166,773,271	13,956,313
Fuel oil..... imp. gal.	312,814,635	11,262,147	282,580,908	9,617,675	300,071,842	10,560,733
Gas oils..... imp. gal.			91,390,183	4,712,675	101,549,871	5,412,798
V.M. & P. or solvent naphtha						
and engine distillate..... imp. gal.	18,075,192	2,043,823	33,947,241	2,987,440	36,223,392	3,183,330
Kerosene..... imp. gal.	52,466,990	5,141,901	48,951,129	4,455,425	37,675,985	3,635,618
Lubricating oils..... imp. gal.	15,105,061	3,656,856	17,194,703	2,983,331	18,928,038	3,896,754
Grease..... lb.	9,629,492	531,759	8,339,991	357,205	9,960,640	563,514
Tar..... lb.						
Asphalt..... imp. gal.	23,082,228	1,934,046	21,627,760	1,698,023	25,584,495	2,303,717
Petroleum coke..... tons	53,787	293,755	54,646	322,379	52,467	200,512
Wax and candles..... lb.	9,195,542	417,304	8,997,682	355,308	10,655,682	476,899
Other products.....		176,402		4,350		171,114
Total for sale.....		68,563,973		67,338,766		72,839,461

Table 215.—Materials Used and Products Made by the Oil Refineries of Canada, 1932-24—Concluded

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
PRODUCTS MADE—Concluded		\$		\$		\$
Made for own use—						
Gasoline (a) straight run..... imp. gal.	72,402	7,472	75,892	6,940	314,778	23,151
(b) by cracking process..... imp. gal.			6,600	743		
Fuel oil (except for cracking)..... imp. gal.	53,459,252	1,787,253	55,884,197	1,611,981	53,918,147	1,836,395
Gas oils..... imp. gal.			458,804	25,981	455,465	23,484
V.M. & P. or solvent naphtha and engine distillate..... imp. gal.	106,435	9,985	71,914	5,611	70,255	4,245
Kerosene..... imp. gal.	58,067	5,406	77,200	6,188	66,008	5,365
Lubricating oils..... imp. gal.	38,842	9,380	54,957	8,731	48,404	12,589
Tar..... imp. gal.					1,306,410	49,927
Grease..... lb.			4,855	255	7,158	444
Asphalt..... imp. gal.			18,420	1,496	108,563	2,044
Petroleum coke..... tons	19,278	104,181	20,079	115,400	9,293	57,961
Still gas..... M cu. ft.	3,836,413	824,386	3,505,405	631,116	3,772,746	777,351
Wax and candles..... lb.			386	15	433	29
Other products.....		48,288		50,498		58,632
Total for own use.....		2,796,351		2,464,955		2,851,617
Total Petroleum refining		71,360,324		69,803,721		75,691,075
Fuel and gas oils made and used in pressure cracking process..... imp. gal.	355,368,388		364,389,832		*309,595,786	
Lubricating oils and greases—						
Lubricating oils..... imp. gal.	462,888	242,196	576,560	311,767	543,258	397,751
Lubricating greases..... lb.	260,853	34,811	896,755	112,656	832,201	104,042
Soaps and soap powders..... lb.	290,955	29,092	310,996	30,386	475,591	39,476
Other products.....		31,334		9,735		10,567
Total lubricating oils and greases		337,433		464,544		551,836
Grand total		71,697,757		70,268,265		76,242,914

* Not including 5,473,582 gallons of heavy naphtha and 1,389,045 gallons of crude.

CHAPTER EIGHT

THE NON-METAL MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Abrasives	Miscellaneous—	Manganese bog
Asbestos	Actinolite	Mineral waters (natural)
Feldspar and Quartz	Barytes	Natro-alunite
Gypsum	Bituminous sands	Phosphate
Iron oxides (ochre)	Fluorspar	Pyrites
Mica	Graphite	Silica brick
Salt	Magnesitic dolomite	Sodium carbonate
Talc and soapstone	Magnesium sulphate	Sodium sulphate

THE ABRASIVES INDUSTRY IN CANADA

The abrasives industry in Canada includes two main divisions: (1) The Natural Abrasives Industry, covering the production of natural abrasives such as grindstones, pulpstones and scythestones, corundum, diatomite, volcanic dust, etc., and (2) The Artificial Abrasives and Abrasive Products Industry, which covers the manufacture of silicon carbide, fused alumina, abrasive wheels, abrasive paper, etc.

(1) NATURAL ABRASIVES

Corundum.—Corundum crystals are found in an area embracing several townships in Renfrew and Hastings counties in the province of Ontario. The commercial production of the mineral commenced in this area about 1900 and shipments reached a maximum in 1906. Corundum mining practically ceased with the perfection and production of artificial abrasives by the electric furnace. In 1921 grain corundum amounting to 403 tons valued at \$55,965 was exported to the United States; since that year no shipments of corundum have been reported in Canada.

The world's supply of corundum now comes almost entirely from the Transvaal in the Union of South Africa where the mineral is described as usually occurring in unconsolidated surface deposits resulting from the disintegration of corundum-bearing gneiss. Shipments of corundum in South Africa during 1934 totalled 3,201.90 tons valued at £23,844 as compared with 1,303.837 tons worth £9,531 in 1933.

The greater portion of the corundum mined is used normally in the manufacture of abrasive wheels. The lens and optical grinding trades also utilize some of the mineral in the form of fine flour or grain.

The higher grades of emery, a mixture of magnetite and corundum, comes largely from Asiatic Turkey and Greece; emery powder is consumed chiefly in the surfacing of plate glass and in the manufacture of abrasive cloth, grinding compounds and polishing and grinding wheels.

No imports or exports of corundum were reported in Canada during either 1933 or 1934. The value of emery, crushed or ground, imported into Canada in 1934 totalled \$40,709 as compared with \$26,371 in 1933. Imports of sand paper, glass, flint and emery paper or emery cloth in 1934 totalled in value \$92,046 as against \$81,559 in the preceding year and of the 1934 imports, \$60,112 came from the United States and \$25,621 from the United Kingdom.

"Metal and Mineral Markets" quoted emery, September, 1935—per ton, f.o.b. New York, domestic crude ore, first grade, \$10. Other American ore, delivered to grinders, per gross ton, \$16; Turkish and Naxos ore, \$30 to \$40. F.o.b. Pennsylvania, in 350 pound kegs: Turkish Khasia and Naxos grain emery, 6½ cents per pound; American, 4 cents.

Diatomite.—Production of diatomaceous earth in Canada during 1934 totalled 1,372 short tons valued at \$54,910 as compared with 1,789 tons worth \$36,648 in 1933. The material in 1934 came from the provinces of Nova Scotia, Ontario and British Columbia. In Nova Scotia

shipments of diatomite were made during 1934 by International Diatomite Industries, Ltd., from the Little River, Digby county, and from East New Annan, Colchester county, about eleven miles south of Tatamagouche harbour. The crude material is excavated from bogs, air-dried to remove moisture, and then fed into a kiln where the balance of the moisture is removed and the carbonaceous matter burned.

In Ontario calcined diatomite was shipped from stock by Diatomite Products Ltd.; the large treatment plant of this company located at Martin Siding, in the Muskoka district, remained inactive throughout the year. At Novar the mill of Dominion Diatomite Ltd. was in operation throughout the latter part of October and shipments of calcined diatomite were made; no crude diatomite was mined during 1934. The plant and deposits of this company were optioned towards the end of the year by Diatomite Refiners Co., Toronto.

At Quesnel in the Cariboo district, British Columbia, a relatively few tons of diatomite was mined by the B.C. Refractories Ltd. This output was shipped to the company's plant in Vancouver and was utilized chiefly for insulation purposes. The Quesnel area contains the largest deposits of diatomite known within the Dominion. During 1934 it was reported that a small testing plant was erected in Vancouver for the treatment of diatomite mud from Burnaby Lake; this deposit is located only a short distance from the city of Vancouver.

The Department of Mines, Ottawa, reports that:—"Deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to foreign competition and to the present comparatively small Canadian demand, only the highest quality and properly prepared diatomite can be successfully marketed on a scale sufficiently large to warrant the operations of a property and the erection of a plant."

The National Research Council, Ottawa, recently conducted research to ascertain whether any of the Canadian deposits of diatomaceous earth could be satisfactorily used in place of the imported earths now used to assist the filtration of syrups in sugar refining. It was found that the earths so far tested were not efficient enough in their raw state. The possibility of increasing their efficiency by processing will next be taken up by the Council.

The amount of diatomite used as an abrasive material in polishes, etc., is relatively small; much greater quantities of the material are now used for filtration purposes and insulation. It is also utilized in the manufacture of asphalt battery boxes, insulation for acoustical purposes, absorbents, light-weight fillers, paints, etc.

Tripoli is a form of silica which closely resembles diatomite but is of entirely different origin, being generally regarded as a chalcidonic variety of silica; no production of this mineral is reported in Canada. It is used to a considerable extent as a mechanical cleanser, in admixture with soap and other detergents and for foundry partings; it is also employed interchangeably with pulverized silica for use as a filler or inert extender in paints and transparent wood fillers. The material is usually sold by sample, the governing factors being the quantity of free quartz grains or "grit," colour and fineness.

Imports of diatomaceous earth or infusorial earth (Kieselguhr) into Canada during 1934 totalled 24,832 cwt. valued at \$39,315 as compared with 48,600 cwt. worth \$72,133 in 1933. In 1934 the entire imports came from the United States.

"Canadian Chemistry and Metallurgy" quote diatomite, September, 1935, various grades \$40—\$60 per ton.

Diatomite shipments in Canada during the first six months of 1935 totalled 293 tons valued at \$5,682 as compared with an output of 755 tons at \$15,110 for the same months of 1933.

Garnets.—Garnets have not been commercially produced in Canada for some years. In 1933 some prospecting work was conducted on garnet deposits occurring in the vicinity of Labelle, Quebec, and northwest of North Bay, Ontario; small trial shipments of the mineral were made from both areas during that year. According to the Department of Mines, Ottawa, about 85 per cent of the world's garnet production is used for making abrasive coated papers and cloths and almost all the balance for glass surfacing. During recent years the artificial abrasive coated papers have made increasing inroads into the garnet paper production.

The bulk of the world's supply of garnet is reported as coming from Gore Mountain, Warren county, New York State, U.S.A. Prices f.o.b. United States mines were quoted \$80—\$85 per ton for concentrates, and \$45 for glass surfacing fines in 1934. No imports of crude garnet into Canada were reported in 1934.

Grinding Pebbles.—No shipments of Canadian pebbles suitable for use as grinding material have been reported since 1926; during that year 64 tons were shipped from deposits occurring on the north shore of Lake Superior near Jackfish. In the United States, pebbles and tube mill liners are made from quartzite at Jasper, Minn.; their use, however, is declining owing to the increasing use of metal balls and steel and rubber liners. The Department of Mines, Ottawa, reports that a considerable deposit of pebbles suitable for grinding purposes occurs on the north shore of Gabarus Bay, Cape Breton county, Nova Scotia.

Grindstones, Pulpstones and Scythestones.—Shipments of grindstones, pulpstones and scythestones from Canadian quarries in 1934 amounted to 987 tons valued at \$46,478 as compared with 498 tons worth \$21,919 in 1933, an increase of 97.8 per cent in quantity and 212 per cent in value.

During 1934 the Read Stone Company, Ltd., operated its sandstone quarry at Quarry Island, Pictou county, Nova Scotia, from May to October; crude grindstones produced at Quarry Island were shipped, for finishing, to the company's plant located at Stonehaven, New Brunswick.

The same company maintained steady production of grindstones and scythestones in the province of New Brunswick, stone being obtained in this province largely in the vicinity of Stonehaven. At Quarryville, New Brunswick, the National Trust Company, receiver for the Miramichi Quarry Company, Ltd., shipped pulpstones finished from stone taken from stock; the dressing works was operated throughout the months of July, August and September. Sandstone quarried by E. A. Smith at Shediac, New Brunswick, was exported to the United States for use as sharpening stone.

In British Columbia, J. A. and C. H. McDonald, Ltd., shipped finished pulpstones from their dressing works located in Vancouver; stone used for these was quarried during 1934 in the Rupert district of Gabriola Island, near Nanaimo.

Report No. 760, recently issued by the Department of Mines, Ottawa, states: "The large size Canadian grindstones are mainly used for sharpening pulp mill knives, and in the United States are used in the file, machine-knife, granite tool, and shear manufacturing industries. The small stones are used for scythe and axe grinding . . . There is a demand for good pulpstones, particularly for use in large magazine grinders, but since deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used in Canadian pulp mills is being produced in Canada . . . The artificial pulpstones made of silicon carbide segments and also more recently of fused alumina segments are gradually but surely replacing the natural stone."

Imports of grinding wheels manufactured by the bonding together of either natural or artificial abrasives, totalled \$103,630 in value in 1934 as compared with a value of \$47,965 in 1933. Imports of grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives, amounted to \$10,366 in 1934 as against a value of \$5,141 in the preceding year. Grindstones numbering 1,024 with a value of \$140,327 were imported in 1934, these were not mounted and not less than 36 inches in diameter. Imports of grindstones, n.o.p., in 1934 numbered 4,056 worth \$4,491. Exports of manufactured grindstones were evaluated at \$4,947 in 1934 as compared with a value of \$2,840 in 1933.

Volcanic Dust (Pumicite).—Shipments of volcanic dust in Canada totalled 31 tons valued at \$620 in 1934 as compared with 118 tons worth \$2,360 in 1933. Most of the production during 1934 came from Williams Lake, British Columbia, and was for use as an oil filtering medium. The material was mined for some years from deposits occurring near Waldeck, situated a few miles east of Swift Current, Saskatchewan. The Saskatchewan deposits were not actively operated in 1934 and shipments in the province amounted to only one ton during the year.

Volcanic dust has been successfully used as a cold water calcimine, as a cleanser, as a glass and metal polish, as a hand cleanser, and as a sweeping compound. The University of Saskatchewan has recently experimented with the mineral as a ceramic glaze.

Possible imports of volcanic dust are not recorded as such, however, imports of pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground, were valued at \$25,142 in 1934 as compared with \$18,113 in 1933.

Tripoli was quoted, United States, October, 1935: car lots, f.o.b. seller's works, air floated, bags, ton, \$27.50 up; double ground, car lots, works, bags, ton, \$18.00 up; once ground, car lots, works, bags, ton, \$16.00 up.

Table 216.—Capital Employed in the Natural Abrasives Industry in Canada, 1933 and 1934

	1933	1934
	\$	\$
Capital employed as represented by:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	31,991	197,637
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	1,274	10,565
(c) Inventory value of finished products on hand.....	8,710	8,935
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	16,581	17,639
Total.....	58,556	234,776

Table 217.—Employees, Salaries and Wages in the Natural Abrasives Industry in Canada, 1933 and 1934

—	1933			1934			
	Number			Number			Salaries and wages
	Male	Female	Total	Male	Female	Total	
							\$
Salaried employees.....	1		1	6		6	5,208
Wage earners.....	18		18	28		28	15,372
Total.....	19		19	34		34	20,580

Table 218.—Wage-Earners, by Months, in the Natural Abrasives Industry, 1934

Month	No.	Month	No.
January.....	5	July.....	49
February.....	10	August.....	44
March.....	12	September.....	61
April.....	13	October.....	29
May.....	45	November.....	21
June.....	41	December.....	5

Table 219.—Production (Sales) of Natural Abrasives in Canada, 1933 and 1934

Province	Diatomite		Grindstones, Pulpstones and Seythstones		Volcanic Dust	
	Tons	\$	Tons	\$	Tons	\$
1933						
Nova Scotia.....	1,747	34,940	21	868		
New Brunswick.....			277	12,051		
Ontario.....	28	1,298				
Saskatchewan.....					118	2,360
British Columbia.....	14	410	200	9,000		
Total.....	1,789	36,648	498	21,919	118	2,360
1934						
Nova Scotia.....	1,320	52,800	50	1,762		
New Brunswick.....			535	27,091		
Ontario.....	46	1,920				
Saskatchewan.....					1	20
British Columbia.....	6	190	402	17,625	30	600
Total.....	1,372	54,910	987	46,478	31	620

Table 220.—Production of Diatomite in Canada, 1925-1934

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925-1926.....			1931.....	1,610	32,789
1927.....	266	6,650	1932.....	1,496	29,509
1928.....	368	8,960	1933.....	1,789	36,648
1929.....	429	10,330	1934.....	1,372	54,910
1930.....	554	13,247			

NOTE.—For years 1896 to 1924, see previous reports.

Table 221.—World Production of Diatomaceous Earth

(Supplied by *Imperial Institute*—London)

(Long tons)

Producing Country	1932	1933	1934
BRITISH EMPIRE			
Northern Ireland.....	3,731	3,998	5,269
Canada.....	1,336	1,597	1,225
Barbados.....	10	10	2
Australia.....	1,484	2,849	(f) 2,672
FOREIGN COUNTRIES			
Denmark (moler) (estimated).....	29,000	21,000	40,000
Finland.....	451	620	626
France.....	9,000	3,000	2,233
Germany.....	(d) 3,945	(d) 4,483	(e) 4,255
Hungary (exports).....	1,017	1,246	1,394
Italy.....	758	1,919	2,264
Norway (exports).....	113	221	84
Portugal.....	—	—	228
Spain (estimated).....	2,200	3,300	2,200
Sweden.....	702	640	1,102
Algeria.....	10,285	10,826	9,772
United States.....	(c) 73,891	(b) 80,300	(b) 98,200
Chile.....	49	1	(a)
Japan.....	7,032	14,371	(a)
Korea.....	1,761	2,994	(a)
Netherlands East Indies.....	40	40	95

Diatomaceous earth is also produced in U.S.S.R. (Russia).

(a) Information not available.

(c) Average of 3 years' production, 1930-1932.

(e) Production of Hessen only.

(b) Estimated.

(d) Exports.

(f) Excluding the production of Victoria, which amounted to 884 long tons during 1933.

Table 222.—Production of Grindstones in Canada, by Provinces, 1925-1934

(For the years 1886 to 1924, see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1925.....	439	16,723	1,296	45,061	1,735	61,784
1926.....	311	15,136	1,202	43,850	1,513	58,986
1927.....	11	220	1,306	47,255	1,317	47,475
1928.....			1,250	45,901	1,250	45,901
1929.....	6	110	1,032	37,291	1,038	37,401
1930.....	6	110	229	9,764	235	9,874
1931.....			198	8,164	198	8,164
1932.....	12	433	188	8,903	200	9,336
1933.....	21	868	140	6,211	161	7,079
1934.....	50	1,762	303	12,781	353	14,543

Table 223.—Production of Pulpstones and Sharpening Stones in Canada, 1925-1934

Year	Pulpstones		Sharpening stones		Year	Pulpstones		Sharpening stones	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1925.....	781	57,781	46	4,600	1930.....	573	49,897	22	2,250
1926.....	1,155	89,541	27	2,700	1931.....	342	27,305	81	2,634
1927.....	911	75,242	23	2,300	1932.....	60	3,500	68	2,899
1928.....	581	52,659	24	2,400	1933.....	214	9,870	123	4,970
1929.....	754	62,336	155	6,617	1934.....	523	27,225	111	4,710

Table 224.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1931-1934

Year	Number for 2 ft. wood	Value	Number for 2-5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1931.....	226	72,588	225	71,760	285	337,580
1932.....	210	65,450	139	46,436	222	249,373
1933.....	321	98,475	95	31,945	199	223,635
1934.....	378	103,811	84	29,680	268	292,359

2. THE ARTIFICIAL ABRASIVES AND ABRASIVE PRODUCTS INDUSTRY

Production of artificial abrasives increased considerably in 1934, the tonnage of crude silicon carbide and fused alumina at 60,994 tons being more than double the output of 28,854 tons in 1933 and the highest reported since 1930. The record production was in 1929 when 75,449 tons were made.

In 1934 reports were received from 14 plants of which 13 were located in Ontario and 1 in Quebec. The total value of production was \$7,414,853 and the average number of employees was 861.

Artificial abrasives were made in 6 works located near the power centres of Niagara Falls and Shawinigan Falls; 3 of these establishments made only fused alumina, 1 made only silicon carbide, and 2 made both fused alumina and silicon carbide. The output of these works was valued at \$6,278,142, including 60,994 tons of silicon carbide and fused alumina worth \$5,814,583 and other products and by-products such as ferrosilicon, firesand, fused magnesia, refractory cements, boron carbide and boron carbide shapes, etc.

Abrasive products such as wheels, paper, cloth, pulpstones, sharpening stones and files, were manufactured in 9 different plants in 1934. Seven concerns made wheels and segments and 2 made abrasive cloth or paper. The production of wheels and segments was valued at \$569,764 in 1934.

Table 225.—Artificial Abrasives Manufactured, 1933 and 1934

Products	Unit of measure	1933		1934	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Crude silicon carbide.....	ton	7,887	765,192	16,398	1,858,746
Fused alumina.....	ton	20,967	1,726,191	44,596	3,955,837
Refractories (silicon carbide, firesand, etc.).....	ton	982	27,060	1,383	33,515
Abrasive wheels and segments.....	xx	.....	336,647	.....	569,764
Sharpening stones and files.....	xx	.....	43,886	.....	62,929
Other products(x).....	xx	.....	651,480	.....	934,062
Total.....	xx	.....	3,550,456	.....	7,414,853

(x) Includes ferrosilicon, abrasive cloth, abrasive paper, tiles, artificial pulpstones, graphite, boron carbide, boron carbide shapes, fused magnesia, refractory cements, firebrick, adhesive tape, etc.

Table 226.—Imports into Canada and Exports of Abrasives in 1933 and 1934

	1933		1934	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS				
Artificial abrasives in bulk, crushed or ground, when imported for use in the manufacture of abrasive wheels and polishing composition.....		194,618		306,377
Diamond dust or bort, and black diamonds for borers.....		354,999		1,395,404
Emery in bulk, crushed or ground.....		26,371		40,709
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives.....		47,965		103,630
Grinding stones or blocks manufactured by the bonding together of either natural or artificial abrasives.....		5,141		10,366
Grindstones, not mounted, and not less than 36 inches in diameter... No.		76,615	1,024	140,327
Grindstones, n.o.p..... No.		2,516	4,056	4,491
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		18,113		25,142
Sand paper, glass, flint and emery paper or emery cloth.....		81,559		92,046
Iron, sand or globules, or iron shot, and dry putty, adapted for polishing glass or granite or for sawing stone.....		7,063		12,642
Manufactures of emery or of artificial abrasives, n.o.p.....		24,717		38,342
Diatomaceous earth or infusorial earth (kieselguhr), ground or unground.....Cwt.	48,600	72,133	24,832	39,315
Total.....		911,810		2,208,791
EXPORTS				
Grindstones, manufactured.....		2,840		4,947
Abrasives—				
Natural, n.o.p., in ore or bulk, crushed or ground (x).....Cwt.	36,096	43,906	26,434	33,512
Artificial, crude, including silicon carbide.....Cwt.	628,958	2,121,681	1,267,651	3,869,613
Artificial, made up into wheels, stones, etc.....		35,933		43,838
Total.....		2,204,360		3,951,910

(x) Including infusorial earth, rotten stone, tripoli, etc.

ASBESTOS

The principal asbestos of commerce occurs in serpentine. That from Canada, and especially from Quebec mines, is found to be more uniform in requisite commercial qualities and therefore more desirable and valuable than asbestos from most other countries.

Finally revised statistics relating to Canadian asbestos production during the calendar year 1934, show an output of 155,980 short tons valued at \$4,936,326 as compared with 158,367 short tons worth \$5,211,177 in 1933. The figures of shipments for 1934 are lower than for the preceding year, both in tonnage and value, by proportional decreases of 1·5 per cent and 5·25 per cent, respectively. The Bureau of Mines for the province of Quebec, from which province the Dominion's entire output of this mineral comes, states that in the latter half of 1933 there had been a very marked improvement in the asbestos market which had raised hopes that the 1934 figures would greatly exceed those of the preceding year and it was a disappointment to notice the falling-off of the monthly shipments after the first quarter of 1934; this, however, is considered only a temporary setback. It may be added that a large proportion of the year's output was stored as "stocks on hand." The average value per ton for asbestos in 1934 was \$31.65 as against \$32.90 in 1933, \$24.72 in 1932, and \$29.29 in 1931. Rock mined in 1934 totalled 2,320,750 tons as compared with 1,566,919 tons in 1933; the tonnage milled in 1934 totalled 1,935,129 while in 1933 the quantity was 1,329,814 tons.

In contrast with the falling-off in production there was an encouraging increase in exports, the tonnage amounting to 83,267 in 1934, representing a 5·8 per cent increase over 1933. Exports of asbestos manufactures including roofing totalled in value \$140,826 in 1934, or an increase of 92·8 per cent over 1933; asbestos sand and waste exports amounted to \$1,100,305 as compared with a value of \$991,417 in the preceding year. Included among the many countries importing Canadian asbestos in 1934, and reflecting the world wide demand for this product of Quebec mines, were the United Kingdom, United States, Australia, Belgium, France, Germany, Italy, Japan, Netherlands and Spain.

A report "Chrysotile Asbestos in Canada" as issued by the Department of Mines, Ottawa, states:—"To be of any commercial value, asbestos needs length, fineness of fibre, combined with infusibility, toughness or tensile strength, and flexibility. It is surprising that sometimes specimens from foreign countries—although very beautiful in appearance—are often wanting in some of these essential physical properties. Qualities like silkiness, length, and flexibility may be determined very easily by the eye and fingers; but tensile strength, and infusibility—those necessary qualities upon which the great value of asbestos depends—can only be determined by systematic tests, made either in a practical way during the course of manufacture or in the laboratory. The Canadian chrysotile asbestos possesses all the above mentioned properties and qualities in a marked degree, the length of the fibre being one of the principal factors determining the grades. Temperatures of 2,000° to 3,000° F. are easily withstood by Canadian asbestos, while with some varieties a temperature of 5,000° F. has apparently produced no visible effect. Specimens of asbestos from the Eastern Townships of Quebec from a depth of 500 feet, and from drill cores to a depth of 1,700 feet are equal in grade to the material produced near the surface."

Both surface and underground methods are utilized in the mining of Quebec asbestos and the milling practices employed in the recovery of the various high grade fibres are considered among the most efficient employed anywhere in the world. Exploration and development on the properties of the operating companies have disclosed reserves of the mineral sufficient for many years to come.

During 1934 research work was continued at the National Research Laboratories, Ottawa, on problems pertaining to the Canadian asbestos industry.

GENERAL REVIEW

United States.—The United States Bureau of Mines reports that commercial production, imports and apparent consumption of raw asbestos in the United States in 1934 showed gains over 1933. The total quantity of asbestos commercially produced in the United States in 1934 was 5,087 short tons valued at \$158,347, compared with 4,745 short tons valued at \$130,677 in 1933. It was practically all chrysotile from Arizona and Vermont, by far the larger part originating in Vermont. Amphibole was mined in Maryland, Montana and Washington. In 1934, Canada contributed 93·9 per cent in quantity and 89·6 per cent in value of the total imports of asbestos into the United States. The U.S.S.R. (Russia in Europe) was the second largest source of raw asbestos imported into the United States in 1934. The Russian total of 2,595 short tons valued at \$89,439 was 2·2 per cent in quantity and 2·6 per cent in value of all imports of asbestos into the United States. An interesting development in the import situation is the rise of Malta; Gozo, and Cyprus Islands to third place in 1934 in the rank of countries exporting asbestos to the United States. Africa ranked fourth among sources of raw asbestos imported into the United States in 1934, the material consisted wholly of high-grade crudes with an average value per ton of \$110.63.

Rhodesia.—Asbestos production in Rhodesia during 1934 totalled 32,213·51 tons valued at £402,745; the average number of Europeans employed in asbestos mining was 182 and the number of natives totalled 3,955.

The Government Mining Engineer for Southern Rhodesia reports that the asbestos industry is now gradually recovering from the effects of the "slump." The output of asbestos reached its peak in 1929 when the amount exported and sold was valued at £892,717. This dropped considerably during 1930-1932, when the output was worth only £248,513. Since then it has gradually recovered and in 1934 £391,636 was exported.

Rhodesian asbestos is mostly mined in the Shabani and Mashaba districts where the deposits are very large, and the grade exceedingly good, the long fibre being of the very best quality and the output second only to Canada. At the present most of the Rhodesian asbestos is quarried, the occurrences being about 250 feet thick, but as they dip away under the overlying serpentine, underground mining is being resorted to and experiments are being made as to the best method of mining.

Union of South Africa.—The Department of Mines for the Union reports that although the average number of persons in service on asbestos mining in the Cape was 102 more during 1934 than during 1933, the quantity of fibre sold dropped from 3,224·656 tons to 2,810·7 tons, and the value from £60,306 to £51,673. This tonnage is less than half what it was during the

peak year 1929. The decrease in production is due to curtailment of operations by some of the larger companies, one of which has produced no fibre during the last two years. The reason given for the curtailment is that the market for blue asbestos is weak. Some of the larger companies function as buyers as well as producers, and they also hold leases over large areas of Crown land at low rental, which leases are subject to cancellation unless the lease areas are worked in a fair and bona fide manner and to the satisfaction of the Inspector. In regard to the sales of asbestos in the Union during 1934 the relative figures for each class of mineral are as follows:—

	1934	
	Tons (2,000 lb.)	Value £
Amosite (Transvaal only).....	3,756-420	37,104
Chrysotile (Transvaal only).....	11,025-300	114,241
Blue (mainly Cape).....	2,812-143	51,688
Total	17,593-863	203,033

The largest asbestos mines in the Union of South Africa are those producing chrysotile in the Barberton district of the Transvaal. The asbestos bearing serpentine occurs in two zones. The belts dip 10 degrees to 20 degrees and underground mining is practised. Amosite of the Lydenburg district of the Transvaal occurs in banded ironstones and underground mining is generally followed. Much of the crocidolite (blue asbestos) of the Cape of Good Hope is obtained from small open pits or from shallow mines worked by natives.

Russia.—In Russia the chrysotile asbestos deposits of the Bajanova district have a thin overburden and a paper by the United States Bureau of Mines states that hand methods of removal were first employed, in 1929 two shafts were sunk and connected with a haulage level at a depth of 50 metres. They were designed for glory-hole mining which proved uneconomical. This method was supplemented and largely superseded in 1930 by electric-shovel loading in open pits with transport by locomotives to inclined haulways up which cars were taken by electric hoists. Mining costs are estimated at about 75 cents a metric ton of rock.

The U.S.S.R. Chamber of Commerce, Moscow, reports that the asbestos works of the Yaroslavl Rubber Combine has started the mass production of pressed asbestos brake linings and it is stated that in 1935, 770,000 metres of asbestos brake lining will be manufactured for motor vehicles of the Gorki and Stalingrad factories. Statistics relating to Russian asbestos production in 1934 are not available. According to the American-Russian Chamber of Commerce, New York, exports of asbestos from Soviet Russia in 1934 totalled 33,715 metric tons valued at 3,247,000 roubles as compared with 21,458 metric tons valued at 2,651,000 roubles in 1933. Exports of asbestos articles in 1934 totalled 98 metric tons worth 9,000 roubles.

Cyprus.—In Cyprus chrysotile asbestos occurs on the slopes of Mount Troodos in irregular veins traversing serpentine formed by alteration of olivine. In 1927 approximately 6,000 workers were employed in the quarries and about 1,500,000 tons of rock were broken. Operations have been conducted on a much smaller scale since that year. Production consisted exclusively of short fibre until 1934 when, according to a report, a small quantity of spinning fibre was shipped. (Abstract from a United States Bureau of Mines Paper).

Work Done by the Cyprus and General Asbestos Co. Ltd., Amiantos
(Imperial Institute)

	Last six months 1934	Last six months 1933
Rock mined..... tons	303,851	238,002
Rock treated..... tons	68,546	52,958
Finished asbestos produced..... tons	4,338	2,277
Finished asbestos exported..... tons	4,000	3,388
Average daily labour (quarries only).....	580	625
Average daily labour (all operations).....	1,036	1,080

The following information has been supplied by "Asbestos," Philadelphia:—"Deposits of asbestos are reported to have been discovered at Hohen Bogen, near Rimbach, in the Bavarian Forest. The deposits are said to be fairly large, and while the asbestos is not of the spinning variety it may find use as micro-asbestos—Plans have been made to open an asbestos quarry in the Chateau-Ville-Vielle-et-Chateau-Queyras commune in the Guil Valley, France—What has every prospect of becoming a new mining industry for New Zealand is the discovery of an extensive deposit of asbestos by a Cromwell asbestos syndicate, the syndicate has, for some time past, been prospecting on what appears to be an extensive deposit on the Kawaray face of Mt. Pisa, results of any tests the mineral may be put to, are being awaited with considerable interest . . . So far only a few tons of asbestos have been taken from the deposits near Onslow, Western Australia, but the seam has been located and explored and is known to extend for at least eight miles from the present working; an asbestos expert states that the asbestos mined is remarkably clean. Western Australia hopes to obtain valuable trade through the development of her deposits."

Uses.—The consumption of asbestos in industry is ever growing and its diversified employment steadily expanding throughout the world. Spinning fibre is utilized in the manufacture of theatre curtains, blankets, clothing, conveyor belts for carrying hot materials, tape, rope, gaskets, clutch facings, brake-band linings and a variety of other manufactures.

Large quantities of the non-spinning fibre are consumed in the production of roofing materials and asbestos paper for pipe coverings, heaters, automobile mufflers, etc. Cement and asbestos compressed in sheets is utilized extensively as millboard, floor tile, corrugated sheeting, lumber, and as lining for electric switch boxes, garages, safes, etc. Non-corrosive, acid resisting pipes made of cement and asbestos are being employed extensively for water and gas mains and sewers. A standard European pipe consists of 80 per cent cement and 20 per cent asbestos. Large quantities of short fibres are consumed in the manufacture of plastic fireproof cements used for boiler, pipe and furnace lining. Short fibres are also used in fireproof paints and as a constituent of asphalt-roofing coatings. The use of asbestos in aircraft construction is becoming increasingly important. Ignited asbestos balls soaked in kerosene are now employed in the extermination of the "tent caterpillar"; asbestos buffers are now being used successfully in all types of power plant foundations, with shallow foundations an additional pack of fibre three inches in depth is often placed in the bottom to absorb jar. "Asbestos," Philadelphia, describes the latest factory built house in the United States as being made of cement, asbestos and steel. It is equipped with a heat and air-cooling unit, and can be put up ready for occupancy in two or three weeks. It sells at from \$3,800 to \$9,900, has a combination living and dining room, two bedrooms, kitchen, store room and bathroom; the asbestos, in the form of panels (asbestos cement board or lumber) is used for the exterior walls, a special aluminium alloy was employed as a trim and the roof was designed for use as a sun deck.

It is interesting to note that an asbestos bearing material which works well under water is reported to have been recently developed; it is tough but readily machined, has a low co-efficient of friction and water is its best lubricant.

Table 227.—Capital Employed in the Asbestos Industry in Canada, 1932-1934

	1932	1933	1934
Capital employed as represented by:	\$	\$	\$
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	23,620,216	18,127,332	18,211,468
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	789,742	389,714	429,551
(c) Inventory value of finished products on hand.....	1,423,282	894,059	1,371,714
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	4,248,122	1,698,862	1,803,617
Total	30,081,362	21,109,967	21,816,350

Table 228.—Employees, Salaries and Wages in the Asbestos Industry in Canada, 1933 and 1934

—	1933				1934			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
Salaried employees.....	118	22	140	\$ 261,684	125	22	147	\$ 281,493
Wage-earners—								
Mine.....	659		659		770		770	
Mill.....	830		830		938		938	
Total.....	1,489		1,489	1,017,409	1,708		1,708	1,327,319
Grand total.....	1,607	22	1,629	1,279,093	1,833	22	1,855	1,608,512

Table 229.—Number of Wage-Earners on Pay Roll in Asbestos Mining Industry, by Months, 1932-1934

Month	1932	1933	1934
January.....	1,344	1,218	1,577
February.....	1,436	1,048	1,587
March.....	1,380	1,016	1,595
April.....	1,130	1,119	1,587
May.....	1,219	1,399	1,780
June.....	1,234	1,392	1,928
July.....	1,216	1,543	1,902
August.....	1,002	1,564	1,806
September.....	1,229	1,920	1,623
October.....	1,275	2,059	1,688
November.....	1,340	1,819	1,762
December.....	1,367	1,754	1,653

Table 230.—Sales and Shipments (x) of Canadian Asbestos, 1932-1934

—	1932		1933		1934	
	Tons	\$	Tons	\$	Tons	\$
Crudes.....	471	119,221	1,306	341,734	1,663	409,853
Fibres.....	45,323	1,885,841	82,005	3,843,887	77,465	3,456,399
Shorts.....	77,183	1,034,659	74,456	1,025,556	76,852	1,070,074
Total.....	122,977	3,039,721	158,367	5,211,177	155,980	4,936,326
Sand, gravel and stone (waste rock only) (a)	3,473	3,369	6,445	3,215	4,672	3,480

—	1932	1933	1934
	Tons	Tons	Tons
Quantity of rock mined.....	1,145,340	1,566,919	2,320,750
Quantity of rock milled.....	1,029,709	1,329,814	1,935,129
Quantity of tailings retreated.....	709,094	521,930	

(x) All from the province of Quebec.

(a) This production is included under the sand and gravel industry.

Table 231.—*Production of Asbestos in Canada, 1925-1934

(For the years 1880 to 1924, see Mineral Production of Canada, 1928)

Year	Short tons	Value	Year	Short tons	Value
1925.....	273,524	\$ 8,977,546	1930.....	242,114	\$ 8,390,163
1926.....	279,403	10,099,423	1931.....	164,296	4,812,886
1927.....	274,778	10,621,013	1932.....	122,977	3,039,721
1928.....	273,033	11,238,360	1933.....	158,367	5,211,177
1929.....	306,055	13,172,581	1934.....	155,980	4,936,326

* Sales.

Table 232.—Imports of Asbestos into Canada, 1932-1934

Item	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Asbestos in any form other than crude, and all manufactures of, n.o.p.....		226,619		233,966		408,020
Asbestos packing.....	55	52,733	79	54,148	83	64,713
Asbestos brake and clutch lining.....		194,745		165,994		218,052
Total.....		474,097		454,108		690,785

Table 233.—Exports of Canadian Asbestos, by Countries of Destination, 1932-1934

Commodity and Destination	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
ASBESTOS—						
United Kingdom.....	1,420	82,567	4,633	303,492	4,618	316,468
United States.....	27,392	1,274,646	48,469	2,324,246	44,541	1,996,915
Australia.....	451	24,800	744	39,162	998	49,859
Belgium.....	1,080	49,707	5,051	275,046	3,548	191,519
France.....	2,380	150,911	2,620	167,832	3,969	245,416
Germany.....	1,969	117,148	4,572	306,713	5,435	441,188
Italy.....	666	48,162	1,647	94,047	618	58,090
Japan.....	6,683	338,576	9,530	422,252	18,489	679,723
Netherlands.....	421	17,800	1,088	50,333	734	35,800
Spain.....	219	11,323	343	14,976	162	7,887
Other countries.....			4	278	155	8,326
Total.....	42,661	2,115,149	78,701	3,998,377	83,267	4,029,191
SAND AND WASTE—						
United Kingdom.....	1,151	25,830	2,816	54,979	2,080	44,620
United States.....	65,613	901,927	63,744	869,994	68,171	964,429
Germany.....	733	13,934	1,666	32,222	2,497	50,787
Netherlands.....	764	18,385	377	7,220	579	11,541
Other countries.....	1,503	26,019	1,693	27,002	1,650	28,928
Total.....	69,769	986,095	70,296	991,417	74,977	1,100,305
ASBESTOS MANUFACTURES, INCLUDING ASBESTOS ROOFING—						
United Kingdom.....		35,325		37,420		91,501
United States.....		7,212		2,033		1,770
Newfoundland.....		3,985		2,125		5,245
Argentina.....		8,513		5,186		4,463
Other countries.....		20,482		26,280		37,847
Total.....		75,517		73,044		140,826

Table 234.—Manufactures in Canadian Asbestos Products Industry, 1933 and 1934

Products	Unit of measure	1933		1934	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Asbestos brake linings.....	ft.	1,707,544	316,938	2,692,184	458,147
Asbestos boiler and pipe coverings.....	ft.	827,667	65,725	1,207,301	99,948
Asbestos clutch facings.....	No.	126,362	19,572	338,069	49,317
Asbestos gaskets and tape.....	lb.	5,294	4,058	38,775	21,058
Asbestos packings.....	lb.	213,752	91,597	196,627	78,860
All other products*.....			259,736		203,653
Total.....			757,626		910,933

* Includes asbestos blackboards, millboard, paper, shingles, yarn, cement, etc., and rubber, duck and flax packings.

NOTE.—A total of 11 plants reported in this industry in 1934, 4 were located in Quebec, 6 in Ontario and 1 in Nova Scotia.

Table 235.—Materials Used in Canadian Asbestos Products Industry, 1933 and 1934

Materials	Unit of measure	1933		1934	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos crude.....	lb.	3,703,800	51,504	4,844,692	66,524
Asbestos cloth and strips.....	lb.	57,784	24,285	36,291	15,703
Asbestos paper, corrugated or plain.....	lb.	173,616	8,454	48,183	2,771
Asbestos yarn.....	lb.	151,128	41,507	247,555	67,044
Portland cement.....	lb.	457,838	2,639	255,452	1,507
Cotton cloth, yarn and waste.....			16,841		10,397
Rubber.....	lb.	37,413	2,775	66,801	8,799
Containers, boxes, etc.....			21,581		30,071
All other materials.....			161,476		184,258
Total.....			331,062		387,074

Table 236.—World Production of Asbestos

(Long tons)

(Supplied by Imperial Institute—London)

Producing country and description	1932	1933	1934	Producing country and description	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES			
Southern Rhodesia.....	14,077	26,948	28,762	Finland (fibre).....	1,677	2,311	3,629
Swaziland..... ⁴				France.....	300	(a)	(a)
Union of South Africa (b).....	7,844	15,185	15,709	Greece.....	8	14	(a)
Canada—				Italy.....	1,461	3,215	(a)
Chrysotile (c).....	112,902	147,153	143,438	United States (sales).....	3,178	4,237	4,542
Crude.....	421	1,166	1,488	Argentina.....	7	.....	(a)
Fibre.....	40,467	73,754	69,165	Brazil.....	36	97	(a)
Shorts.....	68,913	66,479	68,618	China (estimated).....	500	500	500
Sand and gravel.....	3,101	5,754	4,171	Japan (estimated).....	1,000	1,000	1,000
Actinolite.....			27	Korea.....		12	
Cyprus.....	1,520	3,494	7,081	“Manchoukuo”.....	118	104	(a)
India.....	90		25	Turkey.....		118	4
Australia.....	130	279	170				
Total.....	137,000	193,000	195,000	Total*.....	8,000	12,000	14,000
				World's Total*.....	145,000	205,000	209,000

* Excluding the production of U.S.S.R. (Russia); statistics for which are not available.

(a) Information not available.

(b) Production is not available by kinds, but sales were as follows:—

	1932	1933	1934
Amosite.....	1,242 long tons	2,765 long tons	3,354 long tons
Blue.....	2,647 “	2,879 “	2,511 “
Chrysotile.....	6,888 “	8,546 “	9,844 “

(c) Sales and shipments.

FELDSPAR AND QUARTZ

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and for this reason the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this report.

Feldspar.—Production of feldspar in Canada during 1934 totalled 18,302 tons valued at \$147,281 as compared with 10,658 tons worth \$105,117 in 1933 and 7,047 tons at \$81,982 in 1933. The 1934 production records a gain of 71·7 per cent in quantity and 40·1 per cent in value over that of the preceding year and represents the third successive annual increase in feldspar production since 1932.

Imports of ground feldspar into Canada during 1934 totalled 917 tons valued at \$14,255 as compared with 506 tons appraised at \$7,374 in 1933; the imports during both years came entirely from the United States. Exports of Canadian feldspar totalled 10,532 tons valued at \$65,158, representing increases of 192·8 per cent in quantity and 182·4 per cent in value over those of 1933; of the tonnage exported in 1934, 10,496 went to the United States.

Canadian production of feldspar in 1934, as in 1933, came entirely from the provinces of Quebec, Ontario and Manitoba. It is worthy of note that prior to 1933 the commercial output of feldspar was confined only to Quebec and Ontario with the exception of the year 1921 when a relatively small tonnage was shipped in Nova Scotia. In 1933 feldspar was recorded as being mined and sold on a commercial basis for the first time in Manitoba; in 1934 the Manitoba product was utilized largely by the ceramic trade, the mineral being ground at Warrood, Minnesota.

Most of the feldspar mined in Canada is of the high-potash variety. Deposits of soda-rich spar are relatively uncommon and often carry a high proportion of objectionable impurities. A proportion of the best grade feldspar mined in the Buckingham district, Quebec, is utilized for dental purposes.

In Quebec the mineral was mined and shipped during 1934 in the townships of Portland, Derry, and Buckingham in the Gatineau-Lièvre section of the Ottawa valley; shipments from mines in this area went to both Canadian and foreign plants. The grinding mill of the Canadian Flint and Spar Co. Ltd., located at Buckingham, was active throughout the year; various grades of pulverized feldspar are marketed by this company.

Mining activities in the Ontario feldspar industry in 1934 centred chiefly at the McDonald and Bathurst mines in the Perth area of Lanark county. Shipments were also made from the MacDonald mine at Hybla; from a deposit in Fraser township, Renfrew county; from the Mount Pleasant Mine, Burwash; from properties at Britt and Warren in the Parry Sound and Nipissing districts, respectively, and from the Gunter mine, Sabine township, Nipissing district. At Kingston the grinding plant of the Frontenac Floor and Wall Tile Company, Ltd., maintained production throughout the year; this company, in addition to marketing ground feldspar, utilized the material in the manufacture of ceramic products.

During the year the economic importance of nepheline syenite occurring near Bancroft in Hastings county was investigated and a test shipment of the rock made to the United States. For certain ceramic purposes and for use in the glass industry nepheline syenite has been reported as an adequate substitute for feldspar.

In Manitoba near Point du Bois on the Winnipeg river, Feldspar Products Co. Inc., of Warrood, Minnesota, operated the feldspar properties of the Winnipeg River Tin Mines Ltd. Operations were continuous from July to the end of the year and shipments on a royalty basis were made to a grinding plant located at Warrood; in addition to the exports to the United States a relatively small tonnage went to Winnipeg firms.

"Feldspar is used chiefly in the ceramic industry. Another important outlet is the glass industry which, in recent years, has absorbed about 30 per cent of the production. Feldspar is used in glass manufacture primarily as a source of alumina but also contains other valuable ingredients, such as alkalies, soda, and potash. Because of these constituents it melts without becoming entirely fluid and when cool forms a strong, colorless, or only slight colored glass. In most forms of pottery, feldspar is an essential ingredient of both the body and the glaze. Electrical insulators and similar forms of porcelain also contain feldspar." (Minerals Yearbook, 1934—United States Bureau of Mines).

"Metal and Mineral Markets"—New York—publish feldspar prices in September, 1935, as follows: per ton, f.o.b. North Carolina, potash feldspar, 200 mesh, white, \$17 in bulk; soda feldspar, \$19. F.o.b. Maine, Potash, feldspar, white, 200 mesh, \$17 in bulk. Granular glass spar, white, 20 mesh, f.o.b. North Carolina, \$12.50 in bulk. No. 1 potash spar, \$5.50 New Mexico; Crude Clean No. 1 potash spar, \$4.75; ground, \$9.50.

Table 237.—Capital Employed in the Feldspar and Quartz Mining Industry in Canada, 1932-1934

	1932	1933	1934
	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:			
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment. (Estimated value if rented).....	831,620	1,050,026	1,170,106
(b) Inventory value of minerals on hand, stocks in process, fuel and miscellaneous supplies on hand.....	4,904	37,837	55,358
(c) Inventory value of finished products on hand.....	77,679	32,274	41,484
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	21,974	23,655	43,234
Total.....	936,177	1,143,792	1,310,182

Table 238.—Employees, Salaries and Wages in the Feldspar and Quartz Mining Industry in Canada, 1933 and 1934

	1933				1934			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	20	3	23	34,979	37	7	44	50,888
Wage-earners.....	123		123	82,058	268		268	154,620
Total.....	143	3	146	117,037	305	7	312	205,508

Table 239.—Number of Wage-Earners on Pay Roll in Feldspar and Quartz Mining Industry, by Months, 1932-1934

Month	1932	1933	1934
January.....	69	39	170
February.....	81	32	153
March.....	106	34	153
April.....	56	18	145
May.....	102	123	263
June.....	111	172	300
July.....	122	187	356
August.....	113	193	389
September.....	84	200	377
October.....	90	163	355
November.....	122	139	286
December.....	105	132	232

Table 240.—Production of Feldspar in Canada, by Provinces, 1925-1934

Year	Quebec		Ontario		Manitoba		Canada	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1925.....	11,287	94,730	17,394	141,059			28,681	235,789
1926.....	13,168	111,136	22,783	199,102			35,951	310,238
1927.....	12,730	104,618	17,119	154,533			29,849	259,151
1928.....	12,943	104,789	18,954	180,153			31,897	284,942
1929.....	15,790	133,492	21,737	206,979			37,527	340,471
1930.....	17,074	163,802	9,722	104,667			26,796	268,469
1931.....	10,381	86,842	7,962	100,119			18,343	186,961
1932.....	3,390	39,062	3,657	42,920			7,047	81,982
1933.....	6,183	59,283	4,387	45,350	88	484	10,658	105,117
1934.....	9,207	78,853	7,302	61,665	1,793	6,763	18,302	147,281

Table 241.—Imports and Exports of Feldspar, 1930-1934

	Imports*		Exports	
	Tons	\$	Tons	\$
1930.....	3,177	53,341	21,183	165,482
1931.....	1,877	37,297	10,975	88,913
1932.....	1,487	24,875	2,017	15,465
1933.....	561	7,970	3,596	23,076
1934.....	1,039	15,245	10,532	65,158

* Crude and ground.

Table 242.—Consumption of Feldspar in Canada by Specified Industries, 1930-1934

Year	Abrasive products industry		Imported clay products industry		Soaps and cleaning preparations industry		Total all industries (x)	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1930.....	19	370	2,254	51,211	1,000	29,904	7,406	159,220
1931.....	8	190	1,885	34,394	1,001	37,460	6,406	130,635
1932.....	6	173	1,406	28,043	956	26,647	6,049	116,465
1933.....	6	115	861	16,297	989	13,293	6,859	113,536
1934.....	25	688	1,487	30,577	1,091	13,420	7,918	132,209

(x) Includes feldspar consumed in glass manufacture and in 1934 includes feldspar used in the manufacture of glass, enamel and steel products.

NOTE.—The value of feldspar consumed in Canada in the manufacture of iron and steel products in 1931, 1932 and 1933 totalled, \$3,386, \$2,799, and \$2,969, respectively.

Table 243.—World Production of Feldspar, 1932-1934

(Supplied by Imperial Institute)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom (China stone).....	45,091	33,462	47,993	Germany (Bavaria).....	3,494	4,419	6,700
Canada.....	6,292	9,516	16,341	Italy.....	5,137	4,794	7,516
Australia (including China stone).....	1,006	2,570	2,885	Norway.....	20,249	18,202	25,194
India.....	473	677	628	Roumania (b).....	670	1,288	(a)
FOREIGN COUNTRIES				Sweden.....	23,319	32,053	33,924
Czechoslovakia (estimated)	30,000	30,000	30,000	United States (sales).....	104,715	150,633	154,188
Finland (exports).....	1,505	2,663	3,276	Argentina.....	363	370	(a)
				Egypt.....	176	59	.....
				Manchoukuo.....	1,753	(a)	(a)
				Brazil.....	60	.....	(a)

Feldspar is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

Quartz (Silica).—Production of natural silica, including quartzite, silicious fluxing gravel, lode quartz and natural silica sand, totalled 272,563 short tons valued at \$482,265 in 1934 as compared with 185,783 tons worth \$297,820 in 1933 and 189,132 tons at \$276,147 in 1932. Production in 1934, as for the preceding year, came from the provinces of Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia.

A report on silica by the Department of Mines, Ottawa, states that "Quartz and quartzite in sizes from 2 to 6 inches are used in the manufacture of ferro-silicon and as a smelter flux. For silica brick, quartzite is crushed to about 8 mesh. Some quartz is also crushed to make silica sand. Silica sand is generally prepared from a friable sandstone by crushing, washing, drying, and screening to recover different grades of material according to the industry for which it is required. For example, for the manufacture of glass the material should range between 20 and 100 mesh. Silica sand is also prepared from a friable quartz and from vein quartz. Silica is the washed sand or pure quartz crushed and ground in some form of ball mill then either air or water-floated to recover the fine flour. The ceramic industry requires 150 mesh or finer while the paint trade requires air-floated material 250 mesh or finer. The Canadian producers of silica sand are steadily improving their position and each year sees an increasing use of their products. The use of Canadian sand for sand blasting is increasing and the prospects are promising for a still further use of Canadian material for this purpose."

During 1934 the Dominion Steel and Coal Corporation, Limited, quarried silica rock at Leitches Creek, Cape Breton, the product of this quarry was shipped to the silica brick plant of the company located at Sydney. At Melford, Inverness county, silica sand from the Old River Denys property was shipped to New Glasgow by the new operators—Smith and MacDougall.

In Quebec the quarry and mill of the Canadian Carborundum Company, Limited, located at St. Canute, were active from January 1st to December 21st; glass, crude and brick silica sands

were sold or used by this company. At Buckingham, the Canadian Flint and Spar Company, Limited, produced and sold pulverized quartz and at St. Remi d'Amherst, Canadian Kaolin Silica Products Limited maintained steady operations throughout the year producing various grades of silica products; crushing, drying, screening and fine grinding are employed in this plant. At East Templeton, Ottawa Silica and Sandstone, Ltd., conducted both quarry and mill operations and made shipments of silica products. In Joly county a garnet-bearing rock was mined and milled for the production of "garno-grit" for sand blasting; these operations were conducted by McLean-McNicol Limited of Montreal. At St. Bruno de Guigues (near Ville Marie) Flint Sands Limited erected a pilot mill for the treatment of material from a loosely, consolidated sandstone deposit; commercial production was expected in 1935. Fine ground silica products were also produced and shipped from the Lake St. John area by Canadian Silica Products Limited. In addition to the operations referred to, there were numerous shippers of crude quartz; these were located principally in the Ottawa Valley and a considerable proportion of the tonnage sold by them went to the electro-chemical industry.

In Ontario the Killarney quarry of Dominion Mines and Quarries Ltd., was in operation from May to October. Milling was conducted from June to September, and the crushed, sized and washed product was shipped to Welland, Ontario, and Niagara Falls, New York. In Sabine township, Nipissing district, crude quartzite was shipped from Gunter's mine and in Deroche township the quarry of Wright & Company was in operation from July to October; crude material was shipped from this quarry to Sault Ste. Marie, Ontario. In the Sudbury area a considerable tonnage of silica was consumed as a flux in the copper-nickel smelting operations conducted by Falconbridge Nickel Mines Ltd. It was reported that a sandstone occurring near Springvale was being marketed in the crushed state as a moulding sand and that Canadian Refractories Limited was investigating the economic importance of silica sands which occur north of Smoky Falls in association with refractory clays.

In Manitoba, natural silica sands were shipped from Black Island on Lake Winnipeg by the Lake Bar Sand and Gravel Company, Limited, while in Saskatchewan the production recorded as quartz for 1934 represents silicious flux mined and consumed by the Hudson Bay Mining and Smelting Company, Limited. The British Columbia quartz output in 1934 was comprised entirely of this mineral consumed as flux at the Anyox smelter of the Granby Consolidated Mining, Smelting and Power Co. Ltd.

"Metals and Mineral Markets," September, 1935, quotations for silica were: per ton, water ground and floated, in bags, f.o.b. Illinois—325 mesh—\$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air-floated, 325 mesh, 92 to 99½ per cent silica, \$20 to \$30. Glass sand, f.o.b., producing plant, \$1.25 to \$5 per ton; moulding sand, 50 cents to \$3.50; blast sand, \$1.75 to \$6. California, \$5 for quartz and \$2.50 for sand.

"Canadian Chemistry and Metallurgy," August, 1935, quoted silica sand, various grades, car lots at \$8.00—\$9.00 per ton; silica, quartz, 99 per cent, 110 to 220 grade, car lots, max. \$15.00.

Table 244.—Production in Canada and Imports of Quartz and Silica Products, 1933 and 1934

	1933		1934	
	Tons	Value	Tons	Value
		\$		\$
PRODUCTION (x) (SHIPMENTS)—				
Nova Scotia.....	1, 017	1, 447	7, 292	12, 107
Quebec.....	28, 294	109, 533	57, 208	229, 817
Ontario.....	66, 562	86, 146	89, 838	134, 572
Manitoba.....	7, 736	23, 507	931	3, 031
Saskatchewan.....	59, 506	59, 506	92, 447	88, 748
British Columbia.....	22, 668	17, 681	24, 847	13, 990
Canada.....	185, 783	297, 820	272, 563	482, 265
IMPORTS—				
Flint and ground flint stones.....	2, 277	26, 615	2, 340	28, 427
Silex or crystallized quartz, ground or unground.....	4, 370	82, 823	2, 323	53, 430
Silica sand for glass, carborundum and steel and filtration plants and sand blasting.....	64, 114	160, 131	96, 165	226, 188
Silica fire brick, 90 per cent silica.....		147, 901		210, 190

(x) Includes both crude and crushed quartz and quartzite, silica flux and natural silica sands.

Table 245.—Production of Quartz (Silica) in Canada, 1925-1934

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	197,224	363,612	1930.....	226,200	418,127
1926.....	232,082	553,161	1931.....	195,724	303,158
1927.....	233,984	496,364	1932.....	189,132	276,147
1928.....	282,522	523,933	1933.....	185,783	297,820
1929.....	265,949	561,527	1934.....	272,563	482,265

Table 246.—Silica and Sands Consumed in Specified Canadian Industries, 1930-1934

Industry and item	1930	1931	1932	1933	1934
Glass—					
Silica sand.....ton	73,349	62,868	59,143	52,585	65,306
Silica.....\$	347,553	297,158	290,854	272,689	300,834
Acids, Alkalies and Salts—					
Silica.....ton	5,345	6,012	6,342	5,800	12,945
Silica.....\$	19,672	21,262	20,921	21,714	55,330
Artificial Abrasives—					
Silica sand.....ton	45,595	19,358	5,207	13,574	29,991
Silica.....\$	223,499	98,371	27,588	68,186	150,869
Imported Clay Products—					
Flint.....ton	2,816	1,410	1,136	752	1,266
Flint.....\$	28,958	27,853	18,277	10,457	19,709
Paints, Pigments and Varnishes—					
Silica (x).....ton	823	588	493	410	483
Silica.....\$	22,951	18,244	14,837	12,970	22,613
Soaps and Cleaning Powders—					
Silica sand.....ton	3,160	3,170	3,502	3,272	4,831
Silica.....\$	80,422	82,278	76,264	67,930	72,371
Iron and Steel—					
Sands (a).....ton	131,924	91,310	48,945	44,853	81,641
Sands.....\$	576,815	389,214	245,466	197,514	320,576
Brass and Copper Products—					
Moulding and other sands.....ton	2,665	2,694	2,183	1,788	3,108
Moulding and other sands.....\$	23,146	19,929	12,149	10,307	14,499

(x) Includes any silex or infusorial earth used.

(a) Includes moulding, blast and other sand used in the manufacture of primary iron and steel, castings and forgings, boilers, agricultural implements, machinery, automobile parts, railway rolling stock, etc.

NOTE.—In addition to the consumption recorded, silica sand is employed for sand blasting in the stone industry.

GYPSUM

A distinct improvement in the Canadian gypsum industry was realized in 1934. The 1934 sales at 461,237 tons represents a 21.3 per cent increase over the shipments of 380,234 tons in 1933; the value of the 1934 production totalled \$863,776 as compared with \$663,312 for the preceding year or an increase of 30.2 per cent. The 1934 output, as in 1933, came from the provinces of Nova Scotia, New Brunswick, Ontario, Manitoba and British Columbia and increases in tonnage and value of production were recorded for each of these provinces. The quantity of gypsum mined or quarried in 1934 amounted to 493,295 tons as against 370,691 tons in 1933; the quantity of the mineral calcined in "quarry" plants totalled 74,356 tons as compared with 44,086 tons in the preceding year.

Gypsum deposits have been known in Nova Scotia since the time of the earliest settlers and shipments of the crude rock were made from the Windsor district to the United States a number of years before the Revolutionary War. After the war of 1812 these shipments assumed larger proportions and have been increasing almost ever since. The first recorded production in Ontario was in 1822 when a small amount was mined and crushed for fertilizer. During the first half of the nineteenth century the industry in Canada had a varied career, Nova Scotia and Ontario being the principal producers. Of the first discovery of gypsum in New Brunswick very little is known, evidence of very early work having been carried on in the district adjacent to the town of Hillsborough. The deposits in Manitoba were first operated in 1901 and have produced extensively ever since. The first production of gypsum in British Columbia was made in 1911 but it was not until 1926 that the industry was put on a sound basis in this province. Extensive deposits of gypsum are known in Northern Ontario and these deposits form a potential reserve which in years to come, may be called upon to supply material to the northern parts of

Ontario and Quebec. The deposits in Northern Alberta, although situated at a distance from markets are of good grade. The use of anhydrite in England for the manufacture of sulphuric acid, ammonium sulphate and special plasters is rapidly increasing. At the present time Canadian anhydrite is exported principally as a fertilizer for the peanut crop.

The possibilities for expansion of the gypsum industry in Canada are considered bright. The increasing tendency in construction to make buildings as nearly fireproof as possible has greatly increased the demand for gypsum products; special insulating plasters and other products prepared from gypsum have been developed and are finding a ready market. In the field of sound-deadening products, the market for acoustic plasters prepared from gypsum is being rapidly extended.(1)

"One of the more important developments during the past year has been the perfecting of a process whereby grinding and calcining of gypsum is effected in one operation with a greatly reduced equipment outlay . . . products introduced during 1933 include a wall board with a new type of wood-grained surface, a perforated plaster-board lath, and a sound-absorbent gypsum board—a light-weight cellular wall board, weighing only 1,250 pounds per 1,000 square feet, is now manufactured; the process involves the use of hydrogen peroxide and a catalyzer mixed with gypsum plaster. Total decomposition of the peroxide is effected, the gas evolved creating a cellular condition that becomes permanent when the plaster sets. Gypsum-coated sawdust has been tried in the West as an aggregate ingredient in concrete used for fireproofing. Fire tests of building columns protected by gypsum have demonstrated the value of a sanded gypsum-plaster finish through a greater fire resistance proportionate to the thickness than for other block coverings."(2).

Nova Scotia.—At Cheticamp, Inverness county, the Atlantic Gypsum Products Limited conducted extensive gypsum mining operations during 1934; the number 1 quarry was enlarged by connecting the two open faces into one long face of gypsum; the quarries here are connected by rail with the crushing and storage plant at Cheticamp, a conveyor belt running in a tunnel beneath the stock pile conveys the crushed material to the loading pier where it is discharged directly into the hold of the ship. The company also conducts operations at Dingwall, Victoria county; gypsum of two grades are made here. Number 1 grade is worked by hand selection and the balance or Number 2 grade is handled by a half cubic yard power shovel, a conveyor belt having a capacity of 300 tons per hour is utilized for loading ships up to 3,000 tons capacity. At Walton, Hants county, the Atlantic Gypsum Products Limited recently started a new quarry at the head of the old "North Quarry" and a 35-foot face opened up for about 100 feet, the standard gypsum of this quarry is shipped from Walton to New York where it is calcined for use as plaster. The anhydrite goes to Norfolk, Va., where it is used largely as a fertilizer and moisture retainer around peanut plants.

The Connecticut Adamant Plaster Company operates a quarry at Cheverie, Hants county, where a face 18 feet high has been opened up for about 500 feet; overburden is stripped by gasoline shovel. Shipments in 1934 were based on demand; a narrow gauge railway is used to transport the gypsum from the quarry to the pier for shipment to New Haven, Connecticut.

The largest gypsum operations in the province are conducted by the Canadian Gypsum Company at Wentworth, Hants county. The company is operating two main quarries called "The Cables" and "The Meadow" respectively. The "Cables" quarry is the chief producer, overburden here is removed by steam shovel and holes about 60 feet in depth drilled with well-drills; after blasting the displaced mineral is loaded by power shovel into light railway cars for transportation to the crushing plant at the shipping wharf.

The North American Gypsum Company operates a quarry near the town of Baddeck and a narrow gauge railway about a mile long connects the deposit with the crushing and storage plant located on their pier at Baddeck Bay. The quarry face was extended during the year and a programme of diamond drilling was carried out on the property to determine the thickness of the deposit and also the contour of the anhydrite.

Near the entrance of the Mabou Harbour is situated the quarry, crushing, storage and loading plant of the Nova Scotia Coal and Gypsum Company. A quarry face 30 feet in height is worked, tunnelling is employed where the overburden is heavy; the property was inactive in 1934.

(1) Department of Mines, Ottawa.

(2) U.S. Bureau of Mines—1934 Minerals Year Book.

The Windsor Gypsum Company operates the quarry known as the "Mosher" located near Newport Station. The overburden is removed by steam shovel and recent work has been on a face 350 feet long and 40 feet high; broken material is transported by rail to the wharf at Windsor where ocean shipment is made by steamer or sailing vessel to Newburg, New York.

The manufacturing plant of the Windsor Plaster Company is located at Windsor, Hants county, and the company operates a quarry near the village of Brooklyn. At Windsor the ground plaster is calcined in kettles; hard wall and selenite plasters are marketed by the company.

New Brunswick.—The Canadian Gypsum Company operating at Hillsborough, Albert county, possesses extensive deposits of excellent gypsum from which are manufactured various gypsum products at their plant at Hillsborough. The company quarried a considerably greater tonnage of rock in 1934 than in 1933 and a somewhat larger output of gypsum products was realized at the Hillsborough plant.

Near Petitediac Station, F. M. Thompson quarried and shipped a high grade while close grained gypsum, the mineral from this quarry, was shipped to Montreal for manufacture.

Ontario.—The output of gypsum in Ontario rose from 24,460 tons in 1933 to 33,234 tons in 1934 and came from two companies—Gypsum, Lime and Alabastine, Canada, Limited, with a plant at Caledonia, and the Canadian Gypsum Company Limited at Hagersville. The increase of about 26 per cent in quantity coincides with the general revival in the building industry of Ontario. The Canadian Gypsum Company operates on a gypsum seam at a depth of about 90 feet through a three compartment shaft; the modern plant of this company includes a continuous rotary calcining kiln. The Gypsum, Lime and Alabastine, Canada, Limited, manufacturing an extensive line of plasters, insulating materials, acoustic products, etc., announced that the new plant erected at Rochester, England, by Gyproc Products Limited, in which their company has a forty per cent interest, was completed and in production in June, 1934; satisfactory progress has been made and the plant is now working to capacity. Gypsum products plants are also operated by the Canadian company at Montreal and Calgary.

Manitoba.—The tonnage of gypsum sales in Manitoba increased from 6,830 in 1933 to 9,657 in 1934. Two companies operate in this province—the Western Gypsum Products Limited with a quarry at Amaranth and mill in Winnipeg, and Gypsum, Lime and Alabastine, Canada, Limited, with quarries near Gypsumville. This latter company also ships material to Winnipeg for further processing. The plants of both companies were active throughout 1934.

British Columbia.—The only gypsum mining operations of any magnitude in British Columbia were those conducted by Gypsum, Lime and Alabastine, Canada, Limited. The quarry of this company is located at Falkland and the crude gypsum is shipped to Port Mann where it is manufactured into plaster of Paris, plaster boarding, wall board, gypsum wall-block, etc. In addition to the Falkland output a relatively small shipment of gypsite was reported from an independent producer.

Table 247.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1933 and 1934

	1933			1934		
	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:						
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment..... (Estimated value if rented)	3,613,620	3,996,236	7,609,856	2,074,143	3,758,031	5,832,174
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	29,946	114,819	144,765	43,950	97,900	141,850
(c) Inventory value of finished products on hand.....	226,416	41,564	267,980	204,601	53,051	257,652
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	419,281	327,682	746,963	613,009	507,877	1,120,886
Total.....	4,289,263	4,480,301	8,769,564	2,935,703	4,416,859	7,352,562

Table 248.—Employees, Salaries and Wages in the Gypsum Industry in Canada, 1933 and 1934

	1933				1934			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	21	4	25	48,942	35	4	39	59,534
Wage-earners—								
Mine.....	256		256		243		243	
Mill.....	134		134		146		146	
Total.....	390		390	214,337	389		389	265,197
Grand total.....	411	4	415	263,279	424	4	428	324,731

Table 249.—Number of Wage-Earners on Pay Roll or Time Record on the 15th of Each Month or Nearest Representative Date, 1933 and 1934

Month	1933		1934	
	Mine	Mill	Mine	Mill
January.....	89	101	110	92
February.....	86	92	78	124
March.....	81	86	110	154
April.....	164	116	116	134
May.....	224	120	270	153
June.....	279	171	318	180
July.....	393	204	353	150
August.....	495	180	358	181
September.....	345	150	388	184
October.....	367	173	326	147
November.....	333	119	245	149
December.....	209	112	213	112

Table 250.—Annual Production of Gypsum in Canada, by Provinces, 1925-1934

(For the years 1874 to 1924, see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Ontario		Manitoba		British Columbia		Canada	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$		\$		\$
1925..	551,230	1,070,408	71,745	408,917	82,020	491,833	35,088	417,868	240	865	740,323	2,389,891
1926..	678,107	1,187,918	59,546	468,411	89,987	496,059	35,172	461,461	20,916	156,964	883,728	2,770,813
1927..	829,438	1,512,015	85,293	524,550	83,998	500,688	39,895	512,008	24,493	201,754	1,063,117	3,251,015
1928..	1,013,257	1,850,243	75,033	501,252	85,811	553,271	51,285	609,039	20,982	229,843	1,246,368	3,743,648
1929..	948,895	1,152,160	70,482	485,982	100,347	832,689	67,269	631,051	24,696	243,814	1,211,689	3,345,696
1930..	827,063	982,287	82,674	513,677	94,946	776,069	34,157	298,297	32,128	248,458	1,070,968	2,818,788
1931..	707,817	878,487	58,957	451,264	53,358	374,469	23,076	231,124	20,544	176,173	863,752	2,111,517
1932..	341,508	398,861	38,019	297,520	35,655	186,175	12,719	113,739	10,728	84,084	438,629	1,080,379
1933..	315,948	363,528	30,391	88,500	24,460	112,319	6,830	65,471	5,107	46,004	382,736	675,822
1934..	378,287	488,044	30,398	104,709	33,234	141,389	9,657	81,553	9,661	48,081	461,237	863,776

Table 251.—Production in Canada, Imports and Exports of Gypsum, 1933 and 1934

	1933		1934	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
SHIPMENTS BY GRADES—				
Crude (1)—Lump or mine run.....	36,439	43,002	33,165	41,475
Crushed.....	298,579	329,419	369,696	473,558
Fine ground.....	1,030	6,067	652	3,494
Calcined gypsum (2).....	46,688	297,334	57,724	345,249
Total.....	382,736	675,822	461,237	863,776
Total gypsum mined and quarried.....	370,691		493,295	
Total gypsum calcined (2).....	44,086		74,356	
IMPORTS—				
Gypsum, crude (sulphate of lime).....	18	524	18	320
Gypsum ground, not calcined.....	136	4,251	173	4,938
Plaster of Paris or gypsum, calcined and prepared wall plaster.....	615	16,745	551	15,890
Total.....	769	21,520	742	21,148
EXPORTS—				
Gypsum or plaster, crude.....	287,305	344,085	354,978	413,961
Plaster of Paris, ground, and prepared wall plaster.....	634	13,999	712	16,078
Total.....	287,939	358,084	355,690	430,039

(1) Includes some anhydrite quarried in Nova Scotia.

(2) Does not include gypsum calcined in manufacturers' plants at Montreal and Calgary.

The statistics as thus given for Canada cover the primary production of gypsum; these include data for gypsum quarries and for calcining and plaster works when operated in connection with the quarries. In addition there are the secondary or manufacturing plants which include the works making wallboard, blocks, tile, etc.; some of these works purchase crude gypsum from the primary producers and calcine it before using it to manufacture the gypsum products.

Table 252.—Consumption of Gypsum in Canadian Cement Industry, 1930-1934

Year	Tons
1930.....	74,227
1931.....	56,677
1932.....	27,537
1933.....	13,319
1934.....	19,172

GYPSUM PRODUCTS INDUSTRY

In 1934 there were eight manufacturing plants in Canada operating as follows:—a plant at Montreal, P.Q., brought crude gypsum from Nova Scotia, calcined it, and produced gypsum wallboard and acoustical plasters. At Caledonia, Ontario, another manufacturing works brought calcined gypsum from its own quarries and made gypsum blocks, wallboard, acoustical plasters, etc. Gypsum wallboard was also produced at Hagersville, Ontario, the company operating here, also produced wallboard at Hillsborough, New Brunswick. At Winnipeg 2 plants utilized calcined gypsum, obtained from primary plants in that province, in the manufacture of wallboard and tile. At Calgary, Alberta, gypsum wall plasters were manufactured from crude rock obtained from quarries situated in British Columbia while at Port Mann, B.C., a plant utilized calcined gypsum obtained from the Falkland quarries in the production of gypsum blocks, wallboard, tile and dry insulex.

Table 252 (a).—Production of Gypsum Products, including Wallboard, Blocks, Tile, etc., 1931-1934

Year	Selling value at works
	\$
1931.....	1,621,382
1932.....	1,222,004
1933.....	980,589
1934.....	1,089,710

Table 253.—Materials Used in the Gypsum Products Industry, 1933 and 1934

Materials	Unit of measure	1933		1934	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
GYPSUM PRODUCTS GROUP—					
Crude gypsum.....	ton	18,397	68,977	17,481	80,328*
Calcined gypsum.....	ton	30,784	198,393	23,120	156,678
Clay.....	ton	56	999	78	1,487
Glue.....	xx		2,024		238
Hair.....	lb.	69,533	4,151	48,331	2,886
Paper.....	ton	2,034	145,815	3,071	156,575
Retarder.....	lb.	64,688	1,767	93,648	3,106
Sawdust or shavings.....	lb.	300,100	1,545	418,648	2,024
Starch or paste.....	lb.	179,047	11,494	168,000	10,994
Other materials.....	xx		33,179		18,127
Containers, etc.....	xx		13,529		30,123
Total.....	xx		481,873		462,566

DEFINITION OF SPECIFIED GYPSUM PRODUCTS*

When gypsum is calcined at a red heat, or over, and certain substances (usually borax or alum) added and then heated again, the resultant plaster is known as hard finish plaster. It is slower in setting than ordinary plaster but attains a greater degree of hardness. Several different methods have been employed to produce these plasters and the products so obtained are known under such names as Keene's cement, Parian cement, Martin's cement, etc.

The manufacture of insulex is comparatively simple. It consists essentially of the addition of certain chemicals to the calcined gypsum at the plant, which, when water is added to the mixture on the job where it is employed, react together with the liberation of a gas, expanding the mass to many times its normal bulk. Dry insulex is a light, fluffy, flaky gypsum insulation. It can be placed direct from its containers into places to be insulated: it is both fireproof and vermin proof.

Acoustic plasters consist essentially of gypsum plaster to which has been added certain chemicals which develop gas cells during the period of hydration and application of the plaster, and during the initial set. Porous volcanic rock sands are added to these plasters and greatly assist the artificially formed pores in absorbing sound waves.

Gypsum wall board is essentially composed of a layer of gypsum plaster enclosed between two sheets of fibrous material somewhat resembling a high grade blotting paper though not so absorbent. Ingredients used in the manufacture of gypsum wall board consist of calcined plaster to which has been added some material such as sawdust, starch, etc., and water, the core of the plaster being enclosed between two sheets of the fibrous paper material.

In the manufacture of gypsum blocks the material used is calcined plaster and some filler material such as shavings or starch; the materials used in the manufacture of gypsum roofing slabs are the same as for tiles or blocks, with the addition of steel reinforcing rods.

* Excerpts from Report 714, Department of Mines, Ottawa.

Table 254.—World Production of Gypsum, 1932-1934

(Supplied by Imperial Institute)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	995,462	985,055	961,581	Latvia (exports).....	37,759	48,130	89,905
Canada.....	392,585	330,974	440,442	Luxemburg.....	9,254	12,643	(a)
Union of South Africa.....	7,001	11,622	22,929	Roumania (b).....	39,386	56,192	(a)
Cyprus (estimated).....	12,000	14,000	14,000	Spain (g).....	1,133,282	1,070,509	(a)
Palestine.....	1,458	2,561	(a)	Sweden.....	113	48	(a)
India.....	51,421	33,142	46,757	Algeria.....	89,200	82,083	80,026
Australia.....	53,971	60,572	83,258	United States.....	1,264,530	1,192,136	1,371,580
Total.....	1,514,000	1,438,000	1,572,000	Tunis (estimated).....	25,000	25,000	25,000
FOREIGN COUNTRIES				Argentina.....	33,013	34,255	(a)
Austria (d).....	35,000	(a)	(a)	Chile.....	11,800	13,467	(a)
Estonia.....	8,168	5,670	4,828	China.....	52,400	64,100	(a)
France.....	2,048,100	(a)	(a)	Egypt (estimated).....	130,000	130,000	130,000
Germany.....	392,100	477,000	(a)	New Caledonia.....	11,719	11,380	13,400
Greece (b).....	4,334	7,070	(a)	Brazil (estimated).....	2,000	2,000	2,000
Italy (including alabaster).....	521,453	525,395	451,729	Total *.....	5,850,000	(a)	(a)
Yugoslavia.....		927	(a)	* Grand total.....	7,360,000	(a)	(a)

(a) Data not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(c) Estimated by Bundesministerium für Handel und Verkehr.

(g) Including 343,028 cubic metres of gypsum also 80 cubic metres of alabaster converted as per (b) for 1932.

* Gypsum is also produced in Poland, U.S.S.R. (Russia), French Morocco and Peru.

IRON OXIDES (OCHRE)

In 1851, an important deposit of ochre was worked at Pointe du Lac, St. Maurice county, Quebec, and shipments of dried ochre were made to the United States, subsequently, this property was abandoned. Thirty-two years later the manufacture of dry ochre was commenced on a small scale in Iberville township on the Little Romaine river. This deposit was later abandoned but in 1916 it was re-opened and a small quantity of crude ochre was taken out for use as a pigment in the paper industry. A deposit was opened up at St. Malo, Champlain county, in 1885 and a calcining plant erected. Calcined ochre was shipped from the mill to Montreal where it was further prepared for use in the manufacture of paint.

Mine shipments of ochreous iron oxide, crude and refined, during 1934 totalled 4,959 short tons valued at \$66,166 as compared with an output of 4,357 short tons worth \$53,450 in 1933 and 5,240 short tons at \$46,161 in 1932. This material during 1934, as in 1933, came entirely from the provinces of Quebec and British Columbia; deposits in the former province contributed 96 per cent of the total output in both 1933 and 1934.

The mineral in 1934 was shipped in the province of Quebec from deposits located in Marchand township, Labelle county, at La Pointe du Lac and at Red Mill in Champlain county. British Columbia shipments during the year were made from a property situated near Mons.

In Quebec the refining of the crude oxide included dehydration, calcining and milling with air flotation; products from properties in this province were marketed in Canada and the United States. The Canadian output of unrefined natural ochre is employed to a considerable extent in the purification of artificial fuel gas whereas the calcined and milled product is largely absorbed in the paint industry.

The Department of Mines, Ottawa, reports that the present producing localities have been able to meet the requirements of the domestic pigment trade for the cheaper grades for many years past. Should the demand increase, there are other prospective deposits which could be drawn upon; two of these are located in the townships of Iberville and Bergeronnes, Saguenay county, Quebec. Deposits of ochres are also known to exist in Nova Scotia, Alberta, British Columbia, Saskatchewan and Manitoba.

The following pigment price quotations were for September, 1935, and were supplied by "Canadian Chemistry and Metallurgy." Iron oxide, red, natural, 2 cents to 8 cents per pound; red, artificial, 6 cents to 12 cents; yellow, conc., ppt. casks, 9 cents to 13 cents per pound; yellow, domestic, ppt. 5½ cents to 6 cents.

"Metal and Mineral Markets" quote ochre in September, 1935, as follows: per ton, f.o.b. Georgia mines, \$19 in sacks, \$22.50 in barrels. Buff clay, 98 per cent through 325 mesh, \$19 f.o.b. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, \$19.50.

Table 255.—Capital Employed in the Iron Oxides Industry in Canada, 1933 and 1934

	1933	1934
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment.....	117,783	128,698
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	18,418	20,942
(c) Inventory value of finished products on hand.....	19,950	21,090
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	400	2,000
Total	156,551	172,730

Table 256.—Employees, Salaries and Wages in the Iron Oxides Industry in Canada, 1933 and 1934

Class	1933		1934	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
Salaried employees.....	2	\$ 3,212	2	\$ 3,432
Wage-earners.....	20	12,419	30	21,548
Total	22	15,631	32	24,980

Table 257.—Wage-Earners Employed, by Months, 1934

Month	Number	Month	Number
January.....	12	July.....	31
February.....	25	August.....	34
March.....	19	September.....	37
April.....	15	October.....	40
May.....	28	November.....	29
June.....	43	December.....	30

Table 258.—Production of Iron Oxides in Canada, 1925-1934

(For the years 1883 to 1924, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	7,118	91,913	1930.....	6,596	83,873
1926.....	6,626	101,843	1931.....	5,520	49,205
1927.....	6,125	103,536	1932.....	5,240	46,161
1928.....	5,414	111,198	1933.....	4,357	53,450
1929.....	6,518	115,932	1934.....	4,959	66,166

Table 259.—Production in Canada, Imports and Exports of Iron Oxides, 1933 and 1934

	1933		1934	
	Quantity Tons	Value \$	Quantity Tons	Value \$
PRODUCTION (SALES) (x)—				
Quebec.....	4,192	51,965	4,798	64,566
British Columbia.....	165	1,485	161	1,600
Total	4,357	53,450	4,959	66,166
IMPORTS—				
Ochres, ochrey earths, siennas and umbers.....	1,077	35,595	1,028	39,380
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	2,491	573,607	3,130	653,827
EXPORTS—				
Mineral pigments, iron oxides, ochres, etc.....	1,152	70,239	1,618	96,131

(x) Includes both crude and refined.

Of ochres, ochrey earths, siennas and umbers imported in 1934, 139 tons came from the United Kingdom, 593 tons from the United States, 235 tons from France, and 46 tons from Italy.

Table 260.—Consumption of Non-Oxides in Specified Canadian Industries, 1931-1934

Year	Coke and gas		Paints pigments and varnishes		Paints pigments and varnishes	
	Tons (a)	\$	Tons (b)	\$	Tons*	\$
1931.....	5,362	50,029	914	67,752	583	86,539
1932.....	3,736	35,284	701	52,323	512	48,037
1933.....	2,734	29,076	504	43,826	491	43,671
1934.....	3,757	47,010	580	53,539	544	53,236

(a) Oxide or purifying materials.

(b) Iron oxide pigments.

* ochres, siennas and umbers.

MICA

Production (sales) of primary mica in Canada during 1934 totalled 998 tons valued at \$97,071 as compared with an output of 944 tons worth \$49,284 in 1933. The mineral in 1934 was produced in Quebec, Ontario and British Columbia, with the greater part of the Dominion output coming, as in former years, from the first two named provinces. The quantity and value of 1934 shipments show increases of 5.7 per cent and 97 per cent respectively over those of the preceding year and represent the second successive annual increase in Canadian mica production since 1932.

Increases in both quantity and total sales value of all grades of mica were recorded in 1934, these were especially pronounced for knife and thumb-trimmed shipments. Sales of splittings and scrap revealed relatively little change from those of the previous year; interest was added in 1934 by the revival, to some extent, in shipments of rough cobbled mineral. An improvement in the average prices of thumb-trimmed grades and splittings was realized while the average price for knife-trimmed show a slight falling off which was more or less compensated for by a moderate increase in the price of ground mica and scrap.

A very pronounced increase in the exports of Canadian mica occurred in 1934; the total value of these amounting to \$117,802, represents an increase of 155 per cent over 1933. The increase in exports of thumb-trimmed (and rough cobbled) mica to the United Kingdom is especially worthy of note in that they show an increase from 3,900 pounds valued at \$2,027 in 1933 to 147,000 pounds worth \$60,635 in 1934. All exports of scrap mica and waste went to the United States in 1934 and were somewhat less in both quantity and value than for the preceding year. Exports of splittings to the United States and United Kingdom markets increased, with by far the greater proportion of the shipments going to the former country.

The almost general improvement in both domestic and foreign mica markets in 1934 not only stimulated greater domestic production but resulted in an increase over 1933 of 148 per cent in the number of employees and 101 per cent in salaries and wages in the Canadian mica mining industry.

"The Canadian mica production is confined almost exclusively to the phlogopite variety termed in the trade amber mica. Deposits of muscovite or white mica are known, but attempts to mine this type have usually not proved profitable, and the production has been negligible. The productive mica region lies for the most part within a radius of about one hundred miles from the city of Ottawa, the northern portion of the field lying principally between or adjacent to the Gatineau and Lièvre rivers, in Quebec, and the southern portion in the Perth-Kingston district in Ontario. . . . A further small shipment of scrap-grade, white mica, was made in 1934 from a deposit near Enderby, British Columbia, and sent to a mill in Vancouver for grinding. The mica-grinding plant at Buckingham mine, Templeton township, Quebec, continued in intermittent operation during 1934 and reported about double the volume of sales over 1933. . . . Grinding and sizing tests were run in the Mines Branch Ore Dressing Laboratories on a trial shipment of mica schist from Baker Inlet, near Prince Rupert, British Columbia; the rock is soft and easily pulverized and consists essentially of fine, white, flake mica. . . . Sheet mica is marketed in various classes, depending on the amount of preparation the mine-run material

receives. Formerly, much of the output was sold in the semi-rough form, termed thumb-trimmed, but this practice has now been largely supplanted by knife-trimming, which provides a much higher grade of product. Scrap mica, representing the waste from mining or trimming operations, is sold to grinding mills for the production of mica powder, used extensively in the roofing and rubber trades." (Excerpts from Report 760—Mines Branch, Department of Mines, Ottawa).

Table 261.—Capital Employed in the Mica Mining Industry in Canada, by Provinces 1933 and 1934

	1933			1934		
	Quebec	Ontario	Canada	Quebec	Ontario	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:						
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment..... (Estimated if rented).....	206,243	27,037	233,280	47,232	28,037	75,269
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	35,548	1,935	37,483	17,877	2,877	20,754
(c) Inventory value of finished products on hand.....	3,040	2,789	5,829	254	2,785	3,039
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	33,873	1,931	35,804	38,662	1,992	40,654
Total.....	278,704	33,692	312,396	104,025	35,691	139,716

Table 262.—Employees, Salaries and Wages in the Mica Mining Industry in Canada, 1933 and 1934

	1933		1934	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
		\$		\$
Salaried employees.....	3	2,242	4	2,475
Wage-earners.....	38	22,765	98	47,916
Total.....	41	25,007	102	50,391

Table 263.—Production of Mica in Canada, by Provinces, 1925-1934

(For the years 1886 to 1924, see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1925.....	2,415	178,800	1,605	82,663	4,020	261,463
1926.....	1,664	170,118	881	59,086	2,545	229,204
1927.....	1,454	99,194	1,284	75,183	2,738	174,377
1928.....	1,101	54,224	2,559	32,944	3,660	87,168
1929.....	1,062	72,630	2,991	45,919	4,053	118,549
1930.....	430	61,729	740	34,275	1,170	96,004
1931.....	290	30,601	1,049	23,465	1,339	54,066
1932.....	41	4,076	268	2,752	309	6,828
1933*.....	256	39,060	666	9,371	944	49,284
1934*.....	322	85,967	618	9,059	998	97,071

* Total for Canada includes 22 tons valued at \$853, produced in British Columbia in 1933 and 58 tons valued at \$2,045 in 1934.

Table 264.—Production of Mica in Canada, by Grades, 1933 and 1934

	1933			1934		
	Quantity	Value, f.o.b. shipping point	Price per lb.	Quantity	Value, f.o.b. shipping point	Price per lb.
	Lb.	\$	\$	Lb.	\$	\$
Rough cobbled.....	.....	.....	.....	2,459	514	0.21
Knife-trimmed.....	8,591	3,923	0.46	61,003	25,628	0.42
Thumb-trimmed.....	51,881	8,397	0.16	90,726	27,360	0.30
Splittings.....	74,550	27,446	0.37	75,050	33,120	0.44
Scrap.....	1,753,375	9,518	0.005	1,766,031	10,449	0.006
Total.....	1,888,397	49,234	.....	1,995,269	97,071	.....

Table 265.—Imports and Exports of Mica, 1933 and 1934

Imports and exports of mica	1933		1934	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Mica and manufactures of, n.o.p.—				
From—United Kingdom.....	.....	2,070	.....	4,872
United States.....	.....	29,059	.....	40,242
British India.....	.....	1,648	.....	17,268
Germany.....	.....	714	.....	123
Other countries.....	.....	15	.....	170
Total.....	.....	33,506	.....	62,630
Chalk, China, Cornwall or cliff stone and mica schist.....	.....	17,283	.....	21,371
EXPORTS—				
Mica, rough cobbled and thumb-trimmed—				
To—United Kingdom.....	3,900	2,027	147,000	60,635
United States.....	48,900	4,418	43,000	8,939
Mica, scrap and waste—				
To—United States.....	2,138,400	9,476	1,680,400	7,736
Other countries.....	14,000	84	.....	.....
Mica splittings—				
To—United Kingdom.....	18,700	6,278	19,200	6,635
United States.....	57,000	23,201	69,400	31,967
Mica plate and manufactures of (micanite).....	.....	729	.....	1,890
Total.....	.....	46,213	.....	117,802

Table 266.—Exports of Mica from India, 1932-1934

	1932	1933	1934
In blocks.....	Cwt. 6,693	15,702	20,525
Splittings.....	Rupees 1,382,135	2,429,357	3,509,204
	Cwt. 40,328	40,945	72,301
	Rupees 1,966,808	1,662,676	2,496,375
Total of Mica—			
To—United Kingdom.....	Cwt. 22,389	22,505	29,606
	Rupees 1,860,262	2,268,698	3,106,625
Germany.....	Cwt. 5,013	6,161	10,013
	Rupees 239,505	320,961	565,451
France.....	Cwt. 788	1,067	1,763
	Rupees 87,719	79,831	147,282
To—United States.....	Cwt. 11,264	19,812	39,517
	Rupees 544,569	894,321	1,293,077
Other countries.....	Cwt. 7,567	7,102	11,927
	Rupees 616,888	528,222	893,144
Total.....	Cwt. 47,021	56,647	92,826
	Rupees 3,348,943	4,092,033	6,005,579
Value of rupee in Canadian funds.....	30.29 cents	34.768 cents	37.66 cents

Table 267.—Exports of Phlogopite and Other Micas from Madagascar, 1934

	Kg.	Franc
To—France.....	153,837	1,550,000
England.....	119,707	1,003,000
Germany.....	16,578	194,000
United States.....	89,300	613,000
Other countries.....	126	3,000
Total.....	379,548	3,363,000

Mica is found in payable quality and quantity at Miami and Rusambo, Southern Rhodesia. The Rhodesian mica industry reached its zenith in 1929 when the output realized £80,272, since then it has fallen to practically nothing, due not to shortage of supply but to lack of market. Production in 1934 totalled only 3,867 pounds valued at £272 as compared with 8,841 pounds worth £389 in 1933.

Mica mining in the Union of South Africa is conducted in the Letaba district of the Transvaal; actual production in 1934 totalled 694.924 short tons while sales amounted to 306.114 tons valued at £481 as compared with 604.815 tons at £723 in 1933.

Table 268—Consumption of Mica in Specified Canadian Industries, 1931-1934

Year	Electrical apparatus and supplies		Composition roofing		Rubber		Mica products	
	Pounds	\$	Pounds	\$	Pounds	\$	Pounds	\$
1931.....	150,561	101,531	(a)	(a)	103,177	6,265	(a)	10,099
1932.....	102,410	68,747	42,000	683	73,600	4,111	10,100	4,290
1933.....	35,098	27,129	96,000	1,849	89,165	4,769	10,025	6,553
1934.....	93,297	60,520	142,000	2,086	135,424	6,792	16,553	7,040

(a) Data not available.

Table 269.—World Production of Mica

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1932	1933	1934	Producing Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES			
Nigeria.....	(17 cwt.)			Italy.....	9	3	(a)
Northern Rhodesia.....		1	1	Norway.....	31	5	17
Southern Rhodesia.....	13	4	2	Sweden.....	60	67	16
Tanganyika Territory—				U.S.S.R. (Russia).....	7,667	5,687	(a)
Sheet.....			9				
Waste.....	12	11	22				
Union of South Africa (b)...	242	391	273	Madagascar—			
Canada—				Muscovite.....	(88 lb.)	(692 lb.)	
Knife trimmed.....		4	27	Phlogopite, etc.....	136	170	289
Thumb trimmed.....	1	23	41				
Splittings.....	2	33	33				
Rough cobbled.....			1	United States (sales)—			
Scrap.....	274	783	788	Sheets (uncut).....	151	163	261
Ceylon (exports).....	2	(2 cwt.)	20	Scrap.....	6,286	7,813	6,892
India (exports)—				Argentina.....	54	74	(a)
Sheet.....	335	785	1,026	Bolivia (exports).....	8	23	4
Splittings.....	2,016	2,047	3,615	Brazil.....	52	28	12
Australia.....	30	42	138	Korea.....	20	23	101

(a) Information not available.

(b) Nearly all scrap.

The following amounts of lithia mica were produced:—

	1932	1933	1934
Germany.....	156	72	(a) long tons
Portugal.....	2,014	870	294 "

SALT

The shipments of salt in Canada during 1934 totalled 321,753 tons valued at \$1,954,953 as compared with 280,115 tons worth \$1,939,874 in 1933 and 263,543 tons at \$1,947,551 in 1932. The 1934 output represents the second largest in the history of Canadian salt production, being surpassed only by that of 1929, and the total quantity of sales amounting to 163,464 tons during the first six months of 1935 as compared with 153,641 tons for the first half of 1934 would indicate a continuation of the almost steady upward trend in production as experienced since 1931. In 1934 gains in quantity over 1933 were recorded for sales of all grades as listed under the classification employed by the Bureau. It is especially interesting to note the rapidly increasing shipments of salt for consumption in the chemical industry; the quantity of this Canadian mineral reported for such purposes rising from 96,242 tons in 1932 to 124,132 tons in 1934, an increase of 28.9 per cent within three years. Salt was produced during 1934 in Nova Scotia, Ontario, Manitoba and Saskatchewan and gains in output over the preceding year were realized in each of these provinces.

The salt industry of Canada is one of the oldest non-metallic industries of the country, dating back to the early years of the last century when the Hudson's Bay Company obtained their local supplies from the brine springs of the MacKenzie basin. The discovery of salt in Ontario in 1866 was, however, the real beginning of the industry on a substantial basis, and production from the Ontario field has been continuous since that time. The opening of the Malagash deposits in Nova Scotia in 1918 inaugurated the first rock salt mine in the country, and has materially assisted in supplying the demands for salt in the Maritimes, while in the Prairie Provinces salt has been produced since 1933 in both Saskatchewan and Manitoba. No commercial production of the mineral has been reported in Alberta since 1927.

In Nova Scotia the mine of the Malagash Salt Company, Limited, was worked steadily throughout the year and the slope has been extended to the 20th level on the Lucas seam, a length of about 1,500 feet on the slope and 950 feet vertical below the surface. All evaporated salt is derived from brine obtained underground on No. 4 level, at which point fresh water is sprayed on the surface of the salt until the underground reservoir is filled, the supply of fresh water is then cut off and the brine circulated until it reaches 100 per cent saturation, after which it is pumped to the evaporator on the surface. The solid white salt mined is sold in all sizes to meet the trade requirements from large lumps down to very fine mesh. All equipment, both on surface and underground, is operated by electric power generated by the company's own Diesel electric plant.

In Anderdon township, Essex county, Ontario, the plants of Brunner, Mond Canada, Limited, were active during 1934. This company employs a saturated brine solution, obtained by forcing water into wells, for the manufacture of chemicals; a plant to recover calcium chloride from their waste material resulting from the manufacture of soda ash is being erected by this company. At Sarnia, Ontario, the Dominion Salt Company, Limited, was in continuous operation employing vacuum pans and grainers in the production of table, dairy, and other grades of salt. The Goderich Salt Company, located at Goderich, Ontario, operated without interruption during 1934 and installed a new and modern triple-effect vacuum evaporator. At Goderich also the Western Canada Flour Mills Company, Limited, produced various grades of salt throughout the year; exhaust steam is employed in the recovery of salt by this company. Production by Canadian Industries Limited at Sandwich, Ontario, was steady throughout the twelve months of 1934. Triple effect vacuum pans were employed for fine salt and grainers for coarse grades; this company also employs large quantities of brine in the manufacture of chemicals and at Cornwall, Ontario, recently erected and placed in operation a plant for the manufacture of caustic soda and chlorine; salt produced at Sandwich will be utilized at Cornwall. The Warwick Pure Salt Company, Limited, one of Canada's newer salt producers, was in continuous production during 1934; this company operates in Warwick township, Lambton county, and uses open pans. The Walker Salt Corporation drilled a new well for salt at Port Franks, Ontario, and brought its open pan plant into operation in May, 1935.

At Neepawa, Manitoba, the Neepawa Salt Company, Limited, utilizing the grainer system, was in steady operation in 1934. It is reported that this company has been absorbed by Canadian Industries Limited.

In Saskatchewan, the Simpson Oil Company, Limited, maintained normal production at its plant located at Simpson; salt is recovered here by open pan evaporation.

Several years ago the Alberta Salt Company produced an excellent grade of salt at McMurray, Alberta, and efforts have recently been made to recommence salt production in this district.

The Department of Mines, Ottawa, reports that experiments have been carried on with encouraging results in Nova Scotia and elsewhere for the past few years to determine the effect of salt with a mixture of clay as a surface veneer on gravel highways, in order to decrease, if not entirely eliminate, the dust nuisance and heavy maintenance cost of such roads. Considerable research work has also been conducted on this same application of salt in the laboratories of the National Research Council, Ottawa, and it has also been taken up quite vigorously in the United States. The mineral appears to possess considerable potentialities as a highway material and would, if used to any extent on secondary roads, increase very largely the salt output of the Dominion.

The chairman of I.C.I. Alkali Ltd (United Kingdom) states that "rationalisation within the group, containing six factories in all, has gradually brought about an arrangement whereby all our heavy soda ash is made at one factory, all our caustic at another, and the bulk of the output of soda crystals at two plants, one at Silvertown and one at Winnington. The main supplies of light soda ash come from two Cheshire works and from Fleetwood, where calcium chloride our chief by-product, is also made, while the manufacture of all sundry other alkali products is centred at Winnington."

In March, 1935, it was announced that Imperial Chemical Industries Limited had decided upon the manufacture of soda ash in Australia and since the salt, which is the principal raw material, will be obtained by the solar evaporation of sea water, some time must, of course, elapse before the required area of evaporating surfaces can be prepared and put into operation. Operations will be conducted in the Port Adelaide district of South Australia. In 1934 out of a total exportation of 4,004,208 cwt. of soda ash, soda crystals, and sodium bicarbonate from the United Kingdom, 436,648 cwt. went to Australia and in addition Australia took 108,746 cwt. of caustic soda out of a total British export in 1934 of 1,952,086 cwt.

Investigations have been made at the Low Temperature Research Station, Cambridge, England, as to the possibilities of using iodized coverings for fruit when placed in storage. The iodized wraps are made by treating tissue paper with a definite volume of iodine solution; laboratory tests are reported to show that storage rots of fruit can be considerably reduced by this kind of wrapping. In this regard it is interesting to note that iodine has been detected in some of the brines occurring in Western Canada.

Production of bromine in the United States in 1934 amounted to 15,344,290 pounds valued at \$3,227,425, an increase of 51 per cent in quantity and 58 per cent in value over 1933. The increase in output was from the plant recently erected at Wilmington, N.C., and represents the first commercial production of bromine directly from sea water. Bromine is used principally in the form of ethylene dibromide for the manufacture of ethyl gasoline.

It was reported early in 1935 that the ammonia-soda plant constructed at Maiquetia, Venezuela, had commenced operations. It expects to find a market for its soda ash and caustic soda within the country, although a small export trade to contiguous countries may be developed. The new electrolytic alkali plant of the Companhia Electro-Chemica Fluminense, located at Rio de Janeiro, is reported to possess an annual capacity of 2,500 tons of caustic soda; the initial manufacture of bleaching powder will be 700 tons per year; other products will include 300 tons of hydrochloric acid and 1,200 tons of liquid chlorine.

Table 270.—Capital Employed in the Salt Industry in Canada, 1933 and 1934

	1933	1934
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Cost of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	2,910,371	2,917,000
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	152,093	149,289
(c) Inventory value of finished products on hand.....	142,497	183,079
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	503,397	462,230
Total.....	3,708,358	3,711,598

Table 271.—Employees, Salaries and Wages in the Salt Industry in Canada, 1933 and 1934

	1933				1934			
	Number of employees		Total	Salaries and wages	Number of employees		Total	Salaries and wages
	Male	Female			Male	Female		
				\$				\$
Salaried employees.....	46	17	63	144,454	53	18	71	164,685
Wage-earners.....	337		337	328,966	360	38	398	387,313
Total.....	383	17	400	473,420	413	56	469	551,998

Table 272.—Number of Wage-Earners on Pay Roll in the Salt Industry on the 15th of each Month, 1933 and 1934

Month	1933		1934	
	Male	Female	Male	Female
January.....	248	37	325	32
February.....	258	37	322	38
March.....	276	38	327	38
April.....	281	36	340	39
May.....	288	36	371	37
June.....	318	37	361	37
July.....	342	37	352	37
August.....	333	37	375	37
September.....	333	37	408	39
October.....	316	38	375	39
November.....	317	40	395	38
December.....	287	39	379	38

Table 273.—Production of Salt in Canada, by Grades, 1933 and 1934

	Manu- factured tons	Sold tons	Value of salt sold
1933			
			\$
Table, dairy and pressed blocks.....	63,894	61,231	1,120,698
Common, fine.....	67,414	63,786	395,609
Common, coarse.....	18,472	18,118	179,891
Land salt.....	493	305	952
Other grades.....	34,396	31,935	137,984
Brine for chemical works (salt equivalent sold or used).....	104,740	104,740	104,740
Total.....	289,409	280,115	1,939,874
Value of containers.....			591,182
Grand total.....	289,409	280,115	2,531,056
1934			
Table, dairy and pressed blocks.....	71,249	69,779	1,098,817
Common, fine.....	66,194	67,777	384,873
Common, coarse.....	20,224	20,488	185,926
Land salt.....	403	402	1,320
Other grades.....	41,835	39,175	159,885
Brine for chemical works (salt equivalent sold or used).....	124,132	124,132	124,132
Total.....	324,037	321,753	1,954,953
Value of containers.....			603,369
Grand total.....	324,037	321,753	2,558,322

Table 274.—Production of Salt by Provinces (x), 1925-1934

Year	Nova Scotia		Ontario		Manitoba		Saskatchewan	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
1925.....	6,598	49,889	226,315	1,352,504				
1926.....	8,165	68,781	252,345	1,388,672				
1927.....	14,391	102,590	254,181	1,510,777				
1928.....	19,604	118,342	279,841	1,377,629				
1929.....	27,819	157,662	302,445	1,420,424				
1930.....	23,058	136,226	248,637	1,558,405				
1931.....	27,718	143,761	231,329	1,760,388				
1932.....	31,897	150,708	231,138	1,789,751	508	7,092		
1933.....	34,278	161,889	244,107	1,755,087	1,499	18,388	231	4,510
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137	452	8,703

(x) In addition, Alberta produced salt as follows:—1925 . . . 833 tons value \$8,304; 1926 . . . 2,037 tons value \$22,696; 1927 . . . 100 tons value \$1,300.

Table 275.—Production in Canada, Imports, Exports and Consumption of Salt, 1932-1934

	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION.....	263,543	1,947,551	280,115	1,939,874	321,753	1,954,953
IMPORTS—						
Salt, for the use of the sea or gulf fisheries	27,798	100,939	54,439	184,278	57,272	173,023
Salt, in bulk, n.o.p.....	39,065	177,623	51,486	222,082	42,256	166,949
Salt, n.o.p., in bags, barrels, etc.....	34,990	307,195	29,558	240,657	37,471	234,120
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	180	10,197	137	4,220	1,795	11,941
Total.....	102,033	595,954	135,620	651,237	138,794	586,033
EXPORTS.....	5,627	36,248	5,335	43,461	6,597	48,097
APPARENT CONSUMPTION OF SALT.....	359,949	2,507,257	410,400	2,547,650	453,950	2,492,889

Tables 276.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1933 and 1934

Industries	1933		1934	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	43,551,200	216,618	46,095,000	236,185
Slaughtering and meat packing.....		268,232	62,519,037	392,745
Acids, alkalies and salts—Brine (salt content) and dry salt.....	231,406,000	149,326	273,296,000	183,214
Explosives.....	151,019	946	129,770	846
Soaps.....	4,989,624	32,832	5,613,108	30,309
Dyeing, cleaning and laundry work.....	3,827,468	34,516	4,227,701	36,315
Dyeing and finishing of textiles.....	1,217,811	9,493	1,719,970	11,257
Artificial ice.....	2,049,450	8,246	2,446,515	10,806
Abrasives—artificial.....	190,000	874	318,000	1,347
Waterworks.....			1,172,614	
Leather tanneries.....		16,572		14,085
Pulp and paper mills.....	17,746,000	81,673	18,874,000	79,106
Woollen textiles.....		9,126		10,844
Stock and poultry foods.....	1,015,840	7,660	1,166,240	10,434
Bread and other bakery products.....	11,845,400	127,861	12,657,120	135,114
Fruit and vegetable preparations.....	5,589,322	39,515	5,977,986	45,134
Biscuits, confectionery, etc.....	1,004,360	11,745	1,324,960	13,343
Foods, breakfast.....	1,018,036	8,046	1,285,698	9,321
Sausage and sausage casings.....		3,218		5,362
Dairy products,—not specified.....		2,014	513,520	2,605
Breweries.....	214,253	1,950	278,612	2,585
Malt and malt products.....	266,605	1,895	271,070	1,774
Coffee, tea and spices.....	163,865	1,610	145,213	1,479
Macaroni, vermicelli, etc.....	37,982	379	40,795	399
Ice cream cones.....	3,614	42	3,553	38
Foods, miscellaneous.....	331,609	4,675	484,943	6,422
Tobacco, cigars and cigarettes.....	16,915	227	14,740	189

Table 277.—World Production of Salt

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1932	1933	1934
BRITISH EMPIRE			
United Kingdom—			
Rock-salt.....	19,567	21,596	20,848
Brine-salt.....	2,196,632	2,342,579	2,499,025
Malta.....	1,200	1,200	2,200
Mauritius (estimated)			
Sea-salt.....	1,500	1,500	1,500
Nigeria (estimated).....	400	400	400
Somaliland (exports)—			
Sea-salt.....	2,003	2,704	3,161
South West Africa.....	2,069	3,094	2,756
Anglo-Egyptian Sudan.....	9,223	(a)	24,421
Tanganyika Territory.....	6,607	7,209	7,301
Uganda.....	(b) 723	(b) 1,492	(a)
Union of South Africa.....	(a)	86,782	(a)
Canada.....	233,283	258,401	289,319
British West Indies (exports)—			
Sea-salt—			
Bahamas.....	250	2,820	3,143
Leeward Islands.....	759	34	1,336
Turks and Caicos Islands.....	20,625	24,566	18,663
Ceylon.....	17,703	8,222	(a)
Cyprus (estimated).....	3,000	3,000	3,000
India (including Aden)—			
Rock-salt.....	172,043	170,164	1,963,702
Salt.....	1,438,818	1,542,220	
Palestine—			
Rock-salt.....	964	864	(a)
Other salt.....	7,919	8,272	9,241
Australia—			
Victoria (estimated).....	50,000	50,000	50,000
Western Australia.....	2,771	(a)	2,670
South Australia.....	60,063	58,587	61,083
Total*.....	4,200,000	4,600,000	5,000,000
FOREIGN COUNTRIES			
Austria—			
Rock-salt.....	799	1,058	850
Brine-salt.....	167,876	138,447	161,146
Bulgaria—			
Rock-salt.....	3,327	5,590	(a)
Sea-salt, etc.....	32,000	10,000	(a)
Czechoslovakia—			
Rock-salt.....	169,221	148,987	154,992
Brine-salt.....	5,390	5,105	
France—			
Rock-salt and brine-salt.....	1,460,385	1,773,569	1,641,473
Sea-salt.....	164,126	(a)	(a)
Germany—			
Rock-salt.....	2,082,274	1,824,564	1,991,618
Brine-salt.....	477,713	419,564	502,032
Greece—			
Sea-salt (estimated).....	100,000	100,000	100,000
Italy—			
Rock-salt and brine-salt.....	327,066	338,657	387,094
Sea-salt.....	589,137	696,452	566,212
Netherlands (sales).....	59,805	63,923	73,578
Poland.....	380,648	442,393	366,326
Roumania—			
Rock-salt.....	283,520	273,615	305,041
Spain—			
Rock-salt.....	150,272	154,280	(a)
Brine-salt and sea-salt.....	793,780	760,260	(a)
Switzerland.....	81,386	79,079	80,307
Yugoslavia (brine-salt).....	52,011	43,156	41,260
U.S.S.R. (Russia).....	2,617,000	2,900,000	(a)
Algeria—			
Rock-salt and sea-salt.....	56,695	77,632	42,207
Abyssinia (estimated).....	10,000	10,000	10,000
Angola (estimated).....	10,000	10,000	10,000
Belgian Congo.....	662	878	(a)
Canary Islands (estimated).....	2,000	2,000	2,000
Egypt (exports).....	139,852	134,271	283,913
French Morocco—			
Rock-salt.....	(a)	1,557	1,047
French Somaliland (exports).....	30,306	33,755	34,936
French West Africa.....	1,565	(a)	(a)
Italian Somaliland.....	156,600	212,900	(a)
Tripoli (estimated).....	22,000	22,000	22,000
Tunis.....	90,817	85,000	85,592
Mexico (estimated).....	80,000	80,000	80,000
Panama (estimated)—			
Crude-salt.....	50,000	50,000	50,000

Table 277.—World Production of Salt—Concluded

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1932	1933	1934
FOREIGN COUNTRIES—Con.			
United States—			
Rock-salt.....	1,414,938	1,593,743	1,708,198
Brine-salt.....	2,473,054	3,090,202	3,051,285
Evaporated-salt.....	1,833,412	2,106,209	2,037,012
Cuba.....	31,250	(a)	(a)
Argentina.....	178,277	202,321	(a)
Brazil.....	210,829	150,627	76,540
Chile.....	26,190	30,000	(a)
Colombia (estimated)—			
Rock-salt.....	24,000	24,000	24,000
Brine-salt.....	28,000	28,000	28,000
Sea-salt.....	25,000	25,000	25,000
Ecuador.....	14,722	12,803	(a)
Guatemala.....	9,000	(a)	(a)
Peru.....	31,000	33,000	(a)
Venezuela.....	23,275	(a)	(a)
China (estimated).....	2,500,000	2,500,000	2,500,000
Formosa.....	103,588	166,939	(a)
French Indo-China.....	226,400	113,000	158,000
Japan (c).....	563,455	620,745	684,000
Korea.....	136,000	136,000	136,000
Netherlands East Indies—			
Government production.....	204,340	83,265	(a)
Native production.....	28,211	23,740	(a)
"Manchoukuo".....	220,289	303,946	(a)
Philippine Islands.....	34,938	37,339	(a)
Portuguese India (estimated).....	12,000	12,000	12,000
Syria (estimated).....	10,000	10,000	10,000
Turkey.....	216,000	300,000	(a)
Total*.....	21,000,000	22,000,000	23,000,000
World's total*.....	25,000,900	27,000,000	28,000,000

* Salt is also produced in many countries for which statistics are not available, e.g., Gold Coast, Kenya, Bolivia, Siam.

(a) Information not available.

(b) Excluding production of Kibero.

(c) Excluding production from salt beds which although on government beach lands have no fixed areas. Figures refer to years ended March 31 following that stated.

TALC AND SOAPSTONE

Shipments of talc and soapstone ranging from 50 tons to 1,420 tons were made from Canadian deposits during the period 1886 to 1906. Prior to 1900 the production consisted mainly of impure talc and soapstone shipped from Quebec. It was not until 1900 that mining operations were commenced on the high grade talc deposits of the Madoc district. Ground talc was shipped from this district in 1906.

The value of talc and soapstone produced (sales by primary producers) in Canada during 1934 totalled \$180,777 as compared with \$186,749 in 1933 and \$159,038 in 1932. The combined value of these minerals shipped in 1934 represents a decrease from the preceding year of 3.2 per cent. The value of exports at \$95,823 reveals a decline from \$116,950 for 1933; of the 1934 exports 7,858 tons valued at \$81,794 went to the United States and 937 tons at \$12,376 to the United Kingdom. The trend in domestic consumption was generally satisfactory with increases recorded in the paints, pulp and paper, roofing materials and soaps and cleaning preparations industries; consumption of talc and chalk in the toilet preparations industry fell off from 868,952 pounds in 1933 to 723,969 pounds in 1934.

Soapstone products are produced from deposits of the mineral occurring in Broughton and Thetford townships, Quebec. These properties were actively operated in 1934. The mineral is mainly used, in the shape of blocks, as a refractory lining in alkali recovery furnaces in paper mills using the sulphite process. Powdered soapstone finds a good market as a filler in various industries. Mixed with Portland cement it has been used successfully for interior plastering purposes giving a very white velvet finish. It is now used in the manufacture of fireless cookers, fireplaces, stoves, wood or coal burners and electrical heaters. Soapstone is easily carved and when polished takes a soft marble-streaked appearance. Various objects such as tobacco jars, candlesticks, clock cases, and book-holders made of carved and polished soapstone have lately been put on the market and have met with a gratifying reception.

The Canadian talc production in 1934, as for some years past, came chiefly from important deposits of foliated white talc located near Madoc, Ontario; two companies operate mines and mills in this area and produce various grades of high quality talc. Preparation of the mineral for the market includes crushing, drying, grinding and bolting; the products from these mills are marketed in Canada, United States and Europe. Both companies were in continuous operation throughout 1934.

In British Columbia shipments of talc were made in 1934 from Anderson and Sooke Lakes; most of the production in this province is consumed in the manufacture of roofing materials.

Ground talc has many present day uses, being employed in the manufacture of lubricants, toilet preparations, glass, paper, textiles, foundry facings and many other products. It is used as a polishing agent for rice, peanuts and glass and as an insulating material and insecticide. Composition roofing is manufactured from lower grades and in the rubber industry it is employed to prevent compounds from adhering to the heated working parts of machinery. Certain massive talcs, free from cracks, grit or iron oxide are reported by the Bureau of Mines, Washington, D.C., to be employed in the manufacture of the so-called "lava" products; the material which is easily carved in its natural soft state is fashioned into innumerable electrical fittings such as bushings, etc. The articles are then heated, rendering the product hard enough to cut glass. Pencils, crayons and French chalk (tailors' chalk) are also fabricated from massive talc.

"Canadian Chemistry and Metallurgy"—Toronto, published talc prices, September, 1935, as follows: talc, car loads, A.A.I.F. grade to \$17.50 per ton; talc, car loads, No. 1 grade to \$11.50 per ton; talc, car loads, S. grade to \$9.00 per ton and imported Italian talc to \$100 per ton.

The United States Bureau of Mines report that compared with 1933, average 1934 prices as reported by United States producers showed little change. Ground talc and soapstone, which comprised about 93 per cent of the total shipments, ranged from about \$5.00 to \$30.00 per ton. Some high-grade crude talc averaged higher than \$35.00 a ton.

Table 278.—Capital Employed in the Talc and Soapstone Industry in Canada, 1933 and 1934

	1933	1934
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	595,084	557,143
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	9,581	7,350
(c) Inventory value of finished products on hand.....	8,928	8,410
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	70,782	67,291
Total.....	684,375	640,194

Table 279.—Employees, Salaries and Wages in the Talc and Soapstone Industry in Canada, 1933 and 1934

	1933				1934			
	Number of employees		Total	Salaries and wages	Number of employees		Total	Salaries and wages
	Male	Female			Male	Female		
Salaried employees.....	8	2	10	\$ 24,096	9	2	11	\$ 26,516
Wage-earners.....	93	.....	93	58,964	101	.....	101	53,195
Total.....	101	2	103	83,060	110	2	112	79,711

Table 280.—Production of Talc and Soapstone in Canada, 1925-1934

(For the years 1888 to 1924, see Mineral Production of Canada 1928)

Year	Value	Year	Value
	\$		\$
1925.....	205,835	1930.....	186,216
1926.....	217,195	1931.....	157,083
1927.....	236,105	1932.....	159,038
1928.....	219,358	1933.....	190,836
1929.....	229,198	1934.....	180,777

Table 281.—Production (Sales) in Canada, Imports and Exports of Talc and Soapstone, 1932-1934

	1932		1933		1934	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
PRODUCTION—						
Soapstone (Quebec).....		46,751		47,680		44,297
Talc (Ontario and British Columbia).....	12,103	112,287	15,181	143,156	13,959	136,480
Total Canada.....		159,038		190,836		180,777
IMPORTS—						
Talc or soapstone, ground or unground—						
From—United Kingdom.....	197	17,352	226	17,396	121	5,875
United States.....	1,409	22,570	1,700	23,604	2,496	29,812
Other countries.....	294	9,852	224	7,650	280	9,218
Total imports.....	1,900	49,774	2,150	48,650	2,897	44,905
EXPORTS—						
Talc—						
To—United Kingdom.....	1,482	24,186	1,520	26,506	937	12,376
United States.....	6,313	61,329	9,024	86,852	7,858	81,794
Other countries.....	11	275	180	3,592	94	1,653
Total exports.....	7,806	85,790	10,724	116,950	8,889	95,823

Table 282.—Consumption of Talc in Specified Canadian Industries, 1932-1934

Industry and form	1932		1933		1934	
	Quantity	Cost at works	Quantity	Cost at works	Quantity	Cost at works
		\$		\$		\$
Toilet Preparations Industry—						
Talc and chalk.....lb.	747,489	18,600	868,952	25,920	723,969	23,281
Soaps and Cleaning Preparations—						
Talc.....lb.	315,693	2,741	346,641	2,623	371,013	2,989
Roofing Materials Industry—						
Talc.....ton	1,129	12,922	1,180	12,928	1,546	20,448
Pulp and Paper Industry—						
Talc.....ton	213	3,761	1,024	18,862	1,482	23,895
Paints Industry—						
Asbestine.....lb.	2,488,166	32,857	2,758,551	34,597	3,352,426	40,926

Table 283.—World Production of Talc, 1932-1934

(Supplied by Imperial Institute)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	258	166	.....	Greece.....	608	1,252	(a)
Union of South Africa.....	265	276	215	Italy.....	31,860	33,909	37,042
Canada (sales) (e).....	10,806	13,554	12,463	Norway.....	13,322	19,571	33,929
India.....	6,512	17,048	9,375	Roumania.....	(d) 1,770	1,094	1,902
Australia.....	1,347	1,769	1,739	Spain (b).....	4,577	5,682	(a)
				Sweden.....	4,454	4,630	6,398
				Morocco (French) (exports).....	824	518	776
				United States (sales) (e).....	(c) 110,019	148,235	124,022
				Uruguay (exports).....	2,584	1,250	865
				Egypt.....	228	2,491	2,562
				Manchoukuo.....	43,616	61,444	(a)
				Argentina.....	.....	20	(a)
FOREIGN COUNTRIES							
Austria (estimated).....	25,000	25,000	25,000				
Finland.....	1,599	(a)	(a)				
France.....	67,400	(a)	(a)				
Germany (Bavaria).....	3,147	5,026	6,824				

Talc is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) In addition the following were quarried, 1,936 and 3,301 cubic yards in 1932 and 1933, respectively.

(c) Excluding steatite, figures of which are not available for publication.

(d) Converted from cubic metres at rate of 1 cubic metre equals 2 long tons.

(e) Excluding soapstone which is only recorded by value and was as follows:—

1932.....	£11,700
1933.....	£10,600
1934.....	£ 8,900

MISCELLANEOUS NON-METAL MINING INDUSTRIES

Included in this chapter are the following non-metallic minerals:—

Actinolite	Manganese, bog
Barytes	Mineral waters
Bituminous sands	Natro-alunite
Fluorspar	Phosphate
Graphite	Pyrites and Sulphur
Lithium minerals	Silica brick
Magnetitic dolomite	Sodium carbonate
Magnesium sulphate	Sodium sulphate

Statistics relating to capital and labour are combined for these industries and are shown in Tables 284-286. As sulphur output in 1934 represents only a by-product in the smelting and mining of sulphide ores, its value is not included in the net value of shipments in the miscellaneous non-metal mining industry as shown in Table 19.

Finally revised 1934 statistics show a total combined value of \$1,678,482 for the Canadian production (sales) of miscellaneous non-metallic minerals, including actinolite, barytes, bituminous sands, fluorspar, graphite, magnetitic-dolomite (magnesite), magnesium sulphate, mineral waters, peat, phosphate, silica brick, sodium carbonate, sodium sulphate and sulphur. The total value of these sales in 1934 represents an increase of 17.9 per cent over the corresponding total of \$1,423,679 in 1933. Especially noteworthy were the increases recorded in the value of sales for graphite and sodium sulphate, the value in 1934 for the first product represents a gain of 289 per cent over 1933 while that for the latter realized a 21 per cent increase. Other non-metal shipments to show increases in value included magnetitic-dolomite, natural mineral waters, and silica brick.

Table 284.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1933 and 1934

	1933	1934
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—		
(a) Present value of land, buildings, fixtures, machinery, tools and other equipment (estimated value if rented).....	3,698,898	2,715,240
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	87,684	103,130
(c) Inventory value of finished products on hand.....	171,520	186,763
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	244,634	286,709
Total.....	4,202,736	3,291,842

Table 285.—Employees, Salaries and Wages in the Miscellaneous Non-Metal Mining Industries, 1933 and 1934

	1933				1934			
	Number of employees			Salaries and wages	Number of employees			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	34	10	44	62,364	36	9	45	79,333
Wage-earners.....	253		253	179,635	348		348	292,429
Total.....	287	10	297	241,999	384	9	393	371,762

Table 286.—Wage-Earners, by Months, 1932-1934

Month	1932	1933	1934
January.....	80	89	239
February.....	87	94	253
March.....	98	117	269
April.....	166	156	243
May.....	229	175	446
June.....	226	234	498
July.....	197	344	460
August.....	151	378	431
September.....	157	369	402
October.....	175	363	340
November.....	165	322	286
December.....	91	318	283
Average.....	147	253	348

Table 287.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1933 and 1934

Item	Unit of measure	1933		1934	
		Quantity	Value	Quantity	Value
			\$		\$
Actinolite.....	ton			30	365
Barytes.....	ton	20	60		
Bituminous sands.....	ton	466	1,662	862	3,449
Fluorspar.....	ton	73	1,064	150	2,100
Graphite.....	xx		18,367		71,424
Magnesitic dolomite.....	xx		360,128		382,927
Magnesium sulphate.....	ton	120	3,360	42	1,100
Mineral waters.....	Imp. gal.	38,818	5,441	97,440	17,738
Peat.....	ton	1,131	3,449	1,878	7,343
Phosphate (a).....	ton	2,214	5,475	81	683
Silica brick.....	M	636	23,185	2,528	85,945
Sodium carbonate.....	ton	559	5,773	244	1,920
Sodium sulphate.....	ton	50,080	485,416	66,821	587,986
Sulphur (x).....	ton	57,373	510,299	51,537	515,502
Total.....	xx		1,423,679		1,678,482

(a) In 1934, production represents apatite mined in Quebec, while production in 1933 includes both Quebec apatite and sedimentary rock phosphate mined in British Columbia.

(x) Includes sulphur content of pyrites concentrates at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making.

ACTINOLITE

Actinolite production in Canada has been restricted to the townships of Elzevir and Kaladar in Hastings and Addington counties, Ontario. In 1934 actinolite shipments amounted to 30 tons with a value of \$365; the mineral in 1934 was mined near Kaladar, Ontario, by the Actinolite Mining Company; the product of this company is marketed in the ground state and contains a relatively high percentage of added mica flake. Actinolite is used chiefly in the manufacture of roofing materials.

Table 288.—Production of Actinolite in Canada, 1925-1934

(For production from 1897 to 1924, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	40	500	1930.....	34	437
1926.....	80	1,000	1931.....	35	456
1927.....	86	1,075	1932.....		
1928.....	70	875	1933.....		
1929.....	30	375	1934.....	30	365

BARYTES

Deposits of barytes at Five Islands, Colchester county, and Brookfield, Hants county, Nova Scotia, were first operated between 1865 and 1870. These deposits have produced about 5,000 tons of barytes. The McKellar Island deposit in Thunder Bay District, Ontario, in the course of its operations produced several thousand tons of this mineral. Large deposits of barytes at Lake Ainslie, Cape Breton Island, were opened up in 1894. Between 1900 and 1903 the Cap Rouge deposit in North Cheticamp district was operated. In 1918 a deposit in Langmuir township, Ontario, was active and a mill for grinding and preparing barytes completed. Development work was done on the Bellow mine in North Burgess township, Ontario, in 1918. A deposit near Tionaga station was also operated in 1923 and 200 tons of barytes shipped.

Barytes production in Canada during past years came largely from deposits in Nova Scotia, Quebec and Ontario and in recent years more particularly from deposits in the Lake Ainslie district, Nova Scotia. No shipments were reported in Canada during 1934. The Department of Mines, Ottawa, state that "the much stricter specifications of modern industry render it improbable that there will develop any important market for run-of-mine ore, and future development will require the provision of some type of cleaning and grinding equipment to prepare the baryte in the form and of the purity required by modern industry; there being no lithopone or barium chemicals industry in Canada, no demand exists at present for crude ore; there seems little prospect, therefore, of any immediate revival of this industry." In this regard it is interesting to note that Canada Night Hawk Mines Ltd. recently reported the milling of crude barytes at its property located near Connaught, Ontario; the product was not shipped and the property was later reported as inactive.

"The Mineral Industry" refers to barytes as follows: "A new process has been suggested for the purification of crude barytes . . . by this process, barytes and salt are heated together in a tank-type furnace and the melt is discharged into water. The purified and finely divided barytes, most of which is minus 300 mesh, is recovered from the resulting brine by settling. Flotation of barytes has been accomplished successfully by the United States Bureau of Mines and several other research organizations. As acid-bleaching methods are expensive, the flotation process may provide a means of producing a fairly good product that will sell at prices considerably lower than those now demanded for high-grade water-ground and bleached material."

Table 289.—Production of Barytes in Canada, 1925-1934

(For the years 1885 to 1924, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	91	2,259	1930.....	66	1,484
1926.....	105	2,307	1931.....	16	363
1927.....	56	1,268	1932.....		
1928.....	127	2,847	1933.....	20	60
1929.....	105	2,341	1934.....		

Table 290.—Imports of Blanc Fixe, Lithopone and Barytes into Canada, 1931-1934

Year	Lithopone		Barytes		Blanc Fixe	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1931.....	6,931	560,037	3,372,600	32,712	1,596,173	34,483
1932.....	8,055	585,148	2,583,400	22,989	932,168	20,932
1933.....	5,694	406,598	3,174,700	28,255	552,801	11,390
1934.....	7,265	510,558	3,113,800	26,397	968,201	21,638

Of the 1934 barytes imports, 1,523,500 pounds came from Germany, 1,011,400 pounds from the United States and 49,000 pounds from the United Kingdom.

August, 1935, quotations in Canada for barytes No. 1 white, car lots to \$34.50 per ton; off colour, car lots to \$28.00 per ton. Blanc fixe, dry, car lots, to \$70.00 per ton; less car lots to \$80.00 per ton; pulp, car lots to \$40.00 per ton, less car lots, to \$50.00 per ton. Barytes, United

States August quotations, f.o.b. mines, California crude, \$6.00 per ton; Missouri, per ton, water ground and floated, bleached, \$23.00 car lots, f.o.b. works. Crude ore minimum 95 per cent BaSO₄, less than 1 per cent iron, \$5.50; 1 per cent iron and 93 per cent BaSO₄, \$5.00; 90 per cent BaSO₄, \$4.50 f.o.b. mines.

Table 291.—Barytes and Blanc Fixe Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1931-1934

Year	Barytes		Blanc Fixe	
	Pounds	Value	Pounds	Value
		\$		\$
1931.....	2,304,119	39,361	146,025	12,915
1932.....	2,064,303	35,138	23,353	1,817
1933.....	2,062,957	33,578	47,793	1,471
1934.....	2,393,330	44,690	93,918	2,481

Table 292.—World Production of Barium Minerals

(Supplied by *Imperial Institute*)

(Long tons)

Producing country and description	1932	1933	1934
BRITISH EMPIRE			
United Kingdom—			
Barytes, unground.....	35,713	39,943	37,719
Witherite, unground.....	6,258	5,111	10,412
Barytes—			
Ground, bleached.....	1,881	7,623	5,548
Ground, unbleached.....	12,787	13,943	20,315
Southern Rhodesia.....			13
Canada (sales).....		18	
India.....	2,957	5,651	3,813
Australia.....	2,005	2,090	2,492
FOREIGN COUNTRIES			
Austria.....	271	1,014	1,009
France.....	10,200	(a)	(a)
Germany—			
Baden.....	(a)	(a)	19,370
Bavaria.....	5,761	4,081	8,253
Prussia.....	109,553	141,199	321,164
Saxony.....	2,408	128	476
Italy.....	21,516	23,074	31,896
Spain (b).....	8,612	4,193	(a)
Algeria.....	876	10	49
Egypt.....			
United States.....	119,261	130,716	159,251
Brazil.....	1,210	877	(a)
Korea.....	6,465	4,891	5,841

Barytes is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) In addition 49 cubic metres were produced in quarries during 1932, and 75 cubic metres during 1933.

BITUMINOUS SANDS

Production of bituminous sands in Canada in 1934 amounted to 862 tons valued at \$3,449 as compared with an output of 466 tons at \$1,662 in 1933. The material as produced in Canada comes entirely from the Fort McMurray district of Northern Alberta. The following information relating to these sands has been taken from an article by J. M. McClave and which recently appeared in the "Canadian Mining Journal"—"The Alberta sands were noted by Peter Pond in 1788 and by Sir Alexander Mackenzie in 1793. They have been exhaustively studied and mapped, with some shafting and core-drilling by S. C. Ells of the Dominion Mines Branch, the most complete of whose excellent reports is Mines Branch No. 632. . . . the mining of these sands presents no serious problem; it can be done by power shovels or drag line, though the simplest and cheapest method will doubtless be by shale planers. . . . The real problem has been the extraction of oil from the sands after mining. There are three ways in which oil can be recovered

(a) by distillation, (b) by solution with organic solvents, and (c) by digestion with warm water. . . Designs are now being prepared for the first commercial unit (warm water method), to be installed on an oil-sand deposit near Waterways (Fort McMurray). . . . This first plant will be followed as soon as it has proved itself by other and larger units, all portable, until a total capacity of about 3,000 tons (2,100 barrels) per day is reached. . . . The oil content of the Alberta sands has been estimated at some 100 billion barrels."

The total value of petroleum, asphalt and their products imported into Canada in 1934 amounted to \$41,326,516 as compared with a value of \$31,046,337 in 1933. Included in the 1934 imports were 100,305 cwt. of solid asphalt valued at \$114,951 and 1,072,327,455 gallons of crude petroleum in its natural state 7900 specific gravity or heavier at 60 degrees temperature; this was appraised at \$31,907,176.

Table 293.—Production of Bituminous Sands in Canada, 1925-1934*

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	1,148	4,594	1930.....	2,067	8,268
1926.....	528	2,112	1931.....	1,015	4,060
1927.....	2,706	10,824	1932.....	343	1,372
1928.....	94	374	1933.....	466	1,662
1929.....	989	3,956	1934.....	862	3,449

* Production came entirely from the province of Alberta.

FLUORSPAR

Canadian mine shipments of fluorspar in 1934 amounted to 150 tons valued at \$2,100 as compared with 73 tons worth \$1,064 in 1933 and 32 tons at \$464 in 1932. Production in all of these years came from the Madoc area, Hastings county, Ontario. The mineral has also been commercially mined in British Columbia by the Consolidated Mining and Smelting Company of Canada, Ltd.

Fluorspar is used chiefly as a flux in the steel industry while considerable quantities are also consumed in the manufacture of glass, enamel and vitrolite, hydro-fluoric acid and derivatives, foundry castings and cement.

Imports of fluorspar into Canada in 1934 amounted to 144,396 cwt. valued at \$56,628 as compared with 44,388 cwt. at \$21,165 and of the 1933 imports 22,443 cwt. came from the United Kingdom, 6,160 cwt. from the United States and 1,942 cwt. from Germany.

August, 1935, Canadian quotations for fluorspar ranged up to \$33.00 per ton according to grade. United States per net ton, 85 per cent CaF_2 , and not over 5 per cent SiO_2 , Kentucky and Illinois, in bulk, f.o.b. mines, washed gravel, \$13 for all rail movement, \$14 for barge movement. Ground fluorspar, f.o.b. Illinois mines, 95 to 98 per cent CaF_2 and not over $2\frac{1}{2}$ per cent SiO_2 , \$35 in bulk; \$37 in bags or barrels; foreign fluorspar, gravel, 85-5, \$21 to \$21.50 per gross ton, duty paid, Baltimore or Philadelphia.

Table 294.—Production of Fluorspar in Canada, by Provinces, 1925-1934

(For the years 1905 to 1924, see Mineral Production of Canada, 1928)

	Ontario		British Columbia		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1925.....	12	200	3,874	19,034	3,886	19,234
1926-1928.....						
1929.....	70	1,120	17,800	267,000	17,870	268,120
1930.....	80	1,240			80	1,240
1931.....	40	620			40	620
1932.....	32	464			32	464
1933.....	73	1,064			73	1,064
1934.....	150	2,100			150	2,100

Table 295.—Fluorspar Used in Canadian Steel Furnaces and Glass Industry, 1930-1934

Year	Glass industry		Steel furnaces	
	Short ton	Value	Short ton	Value
		\$		\$
1930.....	179	6,458	6,486	92,743
1931.....	96	4,815	4,969	66,471
1932.....	125	4,989	2,253	27,939
1933.....	115	7,803	2,949	31,657
1934.....	119	4,472	4,555	55,643

Table 296.—World Production of Fluorspar

(Supplied by Imperial Institute)

(Long tons)

Producing country	1932	1933	1934
BRITISH EMPIRE			
United Kingdom.....	15,427	28,058	34,216
Union of South Africa.....	1,197	463	1,371
Canada.....	29	65	134
Australia.....	1,260	985	1,737
Newfoundland (c).....			2,400
FOREIGN COUNTRIES			
France.....	15,000	(a)	(a)
Germany—			
Anhalt.....	(a)	(a)	7,241
Baden.....	(a)	(a)	6,424
Bavaria.....	21,569	25,948	29,193
Prussia.....	7,671	10,485	21,215
Saxony.....	1,274	3,614	6,424
Italy.....	6,348	7,592	(a)
Norway.....	562	499	662
Spain (b).....	6,402	3,130	(a)
Mexico.....	151	(a)	(a)
United States.....	15,000	53,000	78,000
Argentina.....	10	197	(a)
China (estimated).....	7,000	7,000	7,000
Korea.....	7,457	8,933	11,908

Fluorspar is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) In addition 160 cubic metres were produced from quarries during 1932 and 120 cubic metres during 1933.

(c) Exports for year ended June 30.

GRAPHITE

In 1934 production of Canadian graphite was valued at \$71,424 as compared with \$18,367 in 1933; this represents an increase in value of 289 per cent. Production in 1934, as for several years past, came chiefly from the Black Donald mine, Renfrew county, Ontario; relatively small shipments were also made from the province of Quebec. Steady operations were maintained throughout the year at the Black Donald mine and various grades of refined graphite were shipped; it is interesting to note that the product of this company is now reported as being successfully employed in the manufacture of pencils.

Recent trends in industrial consumption of graphite indicate that the use of Madagascar flake for the manufacture of crucibles is increasing; Ceylon graphite was at one time used almost exclusively for this purpose. The reported success in milling of the Ceylon and Canadian mineral for pencils may eventually prove of considerable economic importance to producers in these countries; Mexican graphite was employed largely for pencil manufacture during past years.

Artificial or manufactured graphite is now being employed in the manufacture of electrodes, dry batteries, lubricants, and various other products.

The world consumption of graphite has been estimated at approximately 20 per cent for crucibles, 40 per cent for foundry work, 15 per cent for paints, 7 per cent for electrical conductors, 7 per cent for lubricants, 5 per cent for electric batteries, 4 per cent for crayons and 2 per cent for miscellaneous purposes.

Canadian quotations for graphite, August, 1935—100 pound lots—ranged from 15 cents to 40 cents per pound. United States—per pound, f.o.b. New York, Ceylon lump $6\frac{1}{2}$ to $7\frac{1}{2}$ cents; carbon lump, 4 to 6 cents; chip, 5 to 6 cents; dust, 3 to 4 cents. Madagascar flake, 6 to $7\frac{1}{2}$ cents. No. 1 flake, $9\frac{1}{2}$ to 17 cents. Crude amorphous graphite, \$12 to \$23 per ton according to grade.

Table 297.—Production of Graphite in Canada, by Provinces, 1925-1934

(For production from 1886 to 1924, see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1925.....	359	30,900	2,210	127,863	2,569	158,763
1926.....	326	29,516	2,401	165,344	2,727	194,860
1927.....	34	2,043	1,795	109,613	1,829	111,656
1928.....	50	4,668	1,047	52,373	1,097	57,041
1929.....	173	12,652	1,288	90,522	1,461	103,174
1930.....	197	9,850	1,338	86,542	1,535	96,392
1931.....			548	32,149	548	32,149
1932.....			346	18,483	346	18,483
1933.....	43	2,222	362	16,145	405	18,367
1934.....	129	6,426	1,389	64,998	1,518	71,424

Table 298.—Production in Canada, Imports and Exports of Graphite, 1932-1934

	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Ore milled.....	1,424		1,234		2,038	
Production.....	346	18,483	405	18,367	1,518	71,424
IMPORTS—						
Crucibles, plumbago.....		29,909		26,521		36,363
Plumbago, not ground or otherwise manufactured.....		1,869		4,729		2,989
Plumbago, ground and manufactures of, n.o.p.....		70,565		69,003		103,652
EXPORTS—						
Graphite or plumbago, crude or refined..	907	41,146	987	40,115	1,935	90,129
Carbon and graphite electrodes.....		217,732		305,607		564,432

Table 299.—Graphite Used in Specified Canadian Industries, 1931-1934

Year	Paints, pigments and varnishes		Polishes and dressings		Iron and steel and their products	
	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1931.....	184,742	6,761	119,297	6,794	248,294	17,194
1932.....	87,960	3,837	118,027	5,838	142,176	10,755
1933.....	93,740	3,706	114,541	6,224	223,504	12,235
1934.....	110,582	4,643	121,694	6,853	296,624	18,859

Table 300.—World Production of Graphite, 1932-1934

(Supplied by *Imperial Institute*)

(Long tons)

Country	1932	1933	1934	Country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Canada (sales).....	309	362	1,355	Italy.....	2,898	3,149	3,846
Australia.....	70	30	6	Norway.....	661	1,951	2,245
Ceylon (exports).....	6,100	9,559	11,569	Japan.....	487	855	(a)
Union of South Africa.....	49	58	62	Madagascar.....	2,691	3,518	8,343
India.....	5	.....	337	Morocco (French zone)....	236	.....	.....
				Mexico.....	2,013	2,643	3,827
FOREIGN COUNTRIES							
Austria (crude).....	10,431	14,537	17,858	Korea—			
Czechoslovakia.....	907	120	3,447	Flake.....	{ 16,548 }	1,906	2,394
Germany (crude).....	20,479	19,443	17,258	Other.....		20,412	28,406

NOTE.—Graphite is also produced in U.S.S.R. (Russia) and the United States.

(a) Information not available.

MAGNESITIC-DOLOMITE AND MAGNESITE

Production of calcined and dead-burned magnesitic-dolomite in Canada during 1934 amounted in value to \$382,927 as compared with \$360,128 in 1933 or an increase of 6.3 per cent. The production of these materials in Canada is confined to Argenteuil county, Quebec, the deposits occurring some sixty miles west of Montreal and north of the Ottawa river. Steady operations were maintained during 1934 in this area by the International Magnesite Company, Ltd., and Canadian Refractories Ltd. The latter company crush and grind the crude rock to about 100 mesh after which it is burned in rotary kilns to an inert state.

"Deposits of earthy hydromagnesite occur in British Columbia near Atlin and Clinton, and large deposits of silicious magnesite occur in the vicinity of Cranbrook. The reported successful application of flotation methods to the removing of silica and other impurities from magnesite is a development of importance as regards the silicious magnesite deposits.

"The deposits of magnesitic-dolomite in Argenteuil county, Quebec, are ample to supply magnesia products for domestic requirements for many years and also to support a large export trade. No other deposits of magnesitic-dolomite or of commercial magnesite are known to occur in the eastern part of North America." (1)

Magnesia products are utilized principally in manufacture of refractories such as the lining for steel furnaces; it is also used to a lesser extent as a refractory cement. Floors and floor tiles are made from caustic-calcined magnesia and a new development in the industry is the production of refractory brick from dead-burned Canadian magnesitic-dolomite.

"... Supplementary to the efforts to produce basic refractory materials from Grenville (Quebec) magnesitic-dolomite, which was mentioned last year as an outstanding Canadian achievement, a plastic refractory has been developed which is claimed to be superior to all other basic refractory plastics for use in metallurgy and kraft smelters. . . . It has also been reported by the manufacturers that the basic refractory brick made from Grenville magnesitic-dolomite, in addition to the good account it has been giving of itself for metallurgical purposes, has been proving itself highly resistant to the attack of coals having a rather corrosive action." (2)

Canadian quotations for calcined magnesite, August, 1935, ranged \$40—\$50 per ton. United States—per ton f.o.b. California dead-burned, \$25. Artificial periclase, 94 per cent, MgO \$65; 90 per cent, \$35. Caustic, 95 per cent MgO, white color, \$40. Washington—dead-burned grain magnesite, \$22.

(1) Extract—Bulletin 760—Department of Mines, Ottawa.

(2) Extract—Journal of Canadian Ceramics Society, 1935.

Table 301.—Production of Magnesite* in Canada, 1925-1934

(For the years 1908 to 1924, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	5,576	122,325	1930.....	13,336	336,162
1926.....	4,571	137,431	1931.....	11,411	295,579
1927.....	7,337	230,309	1932.....	†	262,860
1928.....	13,195	346,990	1933.....	†	360,128
1929.....	18,809	491,170	1934.....	†	382,927

* Magnesitic-dolomite.

† Owing to the limited number of firms, the data relating to quantity are not published.

Table 302.—Production in Canada, Imports and Exports of Magnesite*, 1932-1934

	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Crude, mined.....	3,123		29,937		30,187	
Crude, calcined or treated.....	17,883		24,837		29,363	
PRODUCTION—Calcined and dead-burned....	(d)	262,860	(d)	360,128	(d)	382,927
IMPORTS—						
Magnesia pipe covering.....		64,924		35,062		45,759
Magnesite (crude rock).....					(cwt. 4)	35
Magnesite firebrick.....		71,077		246,855		396,664
Magnesite, dead-burned, sintered, caustic- calcined or plastic magnesia.....	1,065	28,626	1,403	43,229	472	26,740
EXPORTS—						
Magnesite, calcined or dead-burned.....	1,194	33,103	2,320	63,056	1,997	56,670

* Including magnesitic-dolomite.

(d) Not available for publication.

Imports of magnesia (magnesium oxide) in 1934 totalled 390,001 pounds valued at \$34,462 as compared with 128,220 pounds at \$22,971 in 1933.

Table 303.—World Production of Magnesite, 1932-1934(Supplied by *Imperial Institute*)

(Long tons)

Country and description	1932	1933	1934	Country and description	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Union of South Africa—				Korea—			
Crude magnesite.....	1,396	1,471	1,641	Crude.....	(a)	(a)	3,118
Canada—				Italy—			
Crude magnesite.....	2,788	26,729	(a)	Crude magnesite.....	453	2,152	(a)
India—				Yugoslavia (Serbia only)—			
Crude magnesite.....	13,864	15,206	14,975	Crude magnesite.....	16,084	14,371	24,690
Australia—				Calcined magnesite.....	7,633	5,561	10,312
Crude magnesite.....	5,391	9,720	15,897	Norway—			
Southern Rhodesia—				Crude.....	1,290	1,975	2,461
Crude.....	13			Calcined magnesite (c).. Magnesia bricks (c).....	512 537	579 483	659 660
FOREIGN COUNTRIES				U.S.S.R. (Russia)—			
Austria—				Crude magnesite.....	(a)	361,000	474,000
Crude magnesite.....	132,286	161,736	254,301	United States—			
Caustic magnesia (c).....	30,412	23,462	35,247	Crude magnesite.....	34,341	96,596	90,154
Dead-burned magnesia (c)	28,298	63,260	63,704	Caustic (sales) (c).....	3,013	7,269	6,721
Bricks (c).....	15,283	24,970	28,325	Dead-burned (sales) (c)	13,246	38,940	34,406
Czechoslovakia—				Turkey—			
Calcined magnesite (b)...	13,014	18,988	23,151	Crude magnesite.....	305	936	(a)
Greece—				Manchoukuo—			
Crude magnesite.....	43,993	44,013	(a)	Crude magnesite.....	54,511	70,249	(a)
Caustic magnesia (c).....	9,047	16,039	(a)	Germany (Prussia)—			
Dead-burned magnesia (c)	1,605	2,605	(a)	Crude.....	(a)	(a)	10,836

(a) Information not available.

(b) Exports less imports.

(c) Derived from crude shown, and not additional.

MAGNESIUM SULPHATE (EPSOM SALTS—NATURAL)

Production of natural magnesium sulphate in Canada during 1934 totalled 42 tons valued at \$1,100 as compared with an output of 120 tons worth \$3,360 in 1933. Production for back years represents salts recovered from Basque Lake, British Columbia, and which were treated in an experimental plant at Ashcroft, B.C. The mineral also occurs in association with sodium sulphate in deposits in Saskatchewan. Magnesium sulphate has a medicinal value under the name of Epsom salts and it is used in the finishing of cotton fabrics and for weighting paper, silk and leather.

It is interesting to note that a new works for the manufacture of Epsom salts at Mithapur, near Port Okha, Kathiawad, India, was opened in May, 1935.

Canadian quotations, August, 1935, for magnesium sulphate B.P. barrels, ranged $2\frac{1}{2}$ cents to 3 cents per pound; technical, bags, per ton, \$25.

Imports of magnesium sulphate or Epsom salts totalled 4,599,518 pounds valued at \$48,459 in 1934 as compared with 4,269,852 pounds at \$49,868 in 1933; the material during both years came chiefly from Germany and the United States.

Table 304.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and Tanning, 1931-1934

Year	Pharmaceutical preparations		Tanning*	
	Pounds	Value	Pounds	Value
		\$		\$
1931.....	553,291	21,252	158,040	1,858
1932.....	622,459	28,073	181,811	2,418
1933.....	851,355	24,629	396,424	4,467
1934.....	816,830	33,793	228,281	4,789

* Data not entirely complete.

MANGANESE, BOG

Bog manganese consists mainly of oxide of manganese and water with usually some oxide of iron and often silica, alumina and baryta. Shipments of bog manganese from Dawson Settlement, Albert County, New Brunswick, during 1931 amounted to 77 tons valued at \$462. Some development work in 1934 was reported on a bog manganese deposit located at North Renous, New Brunswick, and a trial shipment of the material may be made in 1935. No commercial shipments of bog manganese have been made since 1931. The mineral is utilized chiefly in the ceramic industry.

Manganiferous ores are utilized chiefly in the production of iron and steel, whereas the consumption in the ceramic and other industries is relatively small.

Imports into Canada in 1934 of manganese oxide totalled 619,069 cwt. valued at \$234,236 as compared with 686,842 cwt. worth \$293,910 in 1933.

MINERAL WATERS

A record of all the natural mineral waters produced in Canada and sold to the general public for medicinal purposes since 1888 has been compiled. In that year 124,850 gallons were produced and during the following ten years production varied between 424,600 gallons and 767,460 gallons. Only the value of shipments were recorded from 1899 to 1920; the high mark for the industry was reached in 1911 when the production was valued at \$223,758.

Shipments of natural mineral waters from Canadian springs totalled 97,440 imperial gallons valued at \$17,738 in 1934 compared with 38,818 imperial gallons worth \$5,441 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec the Abenakis springs on the St. François river in Yamaska county; Potton springs in Brome county and the Coulombia spring at L'Épiphanie. In Ontario, saline

sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot springs in the Fraser Valley and the Halcyon Hot springs on Arrow Lake are noted for their curative properties.

Table 305.—Production of Mineral Waters in Canada, 1925-1934

(For the years 1888 to 1924, see Mineral Production of Canada, 1928)

Year	Imperial gal.	Value	Year	Imperial gal.	Value
		\$			\$
1925.....	190,134	28,413	1930.....	227,141	24,481
1926.....	215,356	29,721	1931.....	217,408	13,234
1927.....	303,530	14,624	1932.....	76,714	7,170
1928.....	269,045	33,498	1933.....	38,818	5,441
1929.....	321,905	16,139	1934.....	97,440	17,738

Table 306.—Production in Canada, Imports and Exports of Mineral Waters, 1932-1934

	1932		1933		1934	
	Imp. gal.	Value	Imp. gal.	Value	Imp. gal.	Value
		\$		\$		\$
PRODUCTION, by provinces—						
Quebec.....	15,506	4,697	9,024	3,094	75,665	16,116
Ontario.....	61,208	2,473	29,794	2,347	21,775	1,622
Total.....	76,714	7,170	38,818	5,441	97,440	17,738
IMPORTS—Mineral and aerated waters.....		110,040		77,552		87,618
EXPORTS—Mineral and aerated waters.....		7,361		5,572		5,322

Table 307.—Sales of Natural Mineral Waters (x) by the Canadian Aerated Waters Industry, 1930-1934

Years	Value
	\$
1930.....	178,348
1931.....	140,730
1932.....	92,066
1933.....	77,125
1934.....	52,113

(x) Whether fortified or not.

PHOSPHATE

The existence of the extensive Lièvre river deposits of crystalline phosphate lime or apatite was first noted in 1829. However, the first commercial shipments of this mineral in Canada were made between 1870 and 1877 from North Burgess township, Ontario, to a superphosphate plant at Brockville. An active market was open in Europe for raw phosphate for fertilizer purposes and this added impetus to the mining of phosphate in Ontario and Quebec. From 1878 to 1892 inclusive, the industry in Canada was at its highest point, and 296,695 tons were produced. Exports during this 15-year period totalled 281,329 tons of which quantity Great Britain received approximately 86 per cent; the United States, 8 per cent; Germany, 5 per cent; and France, Denmark, Spain and Holland, the remainder. The maximum shipment of 31,753 tons was made in 1890. Since 1899, however, the annual production has exceeded the 1,500 ton mark only once.

The discovery and opening up in the United States of the large phosphate deposits in Florida in the nineties and later of those in Tennessee, the western states and Africa, caused a sharp falling-off in prices for phosphate and resulted in the closing of the large Canadian mines.

The production of Canadian phosphate since 1895 has been mainly obtained as a by-product in the mining of mica. Activity in the phosphate industry in Canada has been practically negligible for a number of years.

Shipments of Canadian mined phosphate during 1934 totalled 81 tons valued at \$683 as compared with 2,214 tons worth \$5,475 in 1933. The 1934 output consisted only of apatite mined in the province of Quebec, whereas, the production in 1933 included rock or sedimentary phosphate mined at Fernie and Crowsnest, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Ltd. The apatite production in Quebec was utilized in an electro-chemical plant while the sedimentary phosphate of British Columbia was employed in the manufacture of fertilizer at Trail, British Columbia. The Crowsnest phosphate property of Consolidated Mining and Smelting Company remained inactive throughout 1934.

"The Mineral Industry" reports: "The world's production of phosphate rock in 1934 amounted to approximately 9,000,000 metric tons, an increase of 7 per cent over the 1933 figure. In 1934, Algeria, Egypt, Morocco and Tunisia produced approximately 46 per cent of the world's phosphate; the United States produced approximately 32 per cent; and Russia produced approximately 9 per cent. . . . The laboratory work of the Bureau of Chemistry and Soils, United States Department of Agriculture, on the preparation of calcined phosphate by heating silica-containing phosphate rock in the presence of water vapour was continued in 1934; as shown by pot tests, the plant-food value of the phosphorus in properly prepared calcined phosphate is as high as that of the phosphorus in superphosphate and dicalcium phosphate. . . ."

United States quotations, September, 1935, for phosphate per long ton, f.o.b. mines: Florida pebble, for export 77 to 76 per cent, \$7.25; 75 per cent, \$6.50; 68 per cent, \$4.50. Tennessee, ground lime phosphate, 85 per cent through 300 mesh, 34.30 per cent P_2O_5 , \$8.25 per short ton, bags extra.

Table 308.—Production of Phosphate in Canada, by Provinces, 1928-1934

Year	Quebec		British Columbia		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1928.....	91	1,126	550	7,150	641	8,276
1929.....	40	800	1,145	4,580	1,185	5,380
1930.....	40	760	.....	.....	40	760
1931.....	.....	.....	.....	.....	.....	.....
1932.....	1,316	12,333	.....	.....	1,316	12,333
1933.....	105	805	2,109	4,670	2,214	5,475
1934.....	81	683	.....	.....	81	683

Table 309.—Imports of Phosphate and Phosphate Products, 1932-1934

	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
IMPORTS—						
Phosphate rock.....	71,433	346,907	18,351	74,527	31,775	165,240
Acid phosphate (not medicinal).....	1,387	226,136	1,241	192,213	1,257	172,279
Phosphorus and compounds, n.o.p.....	160	32,888	656	45,515	115	29,474
Superphosphate or acid phosphate of lime	60,699	532,799	54,437	503,474	79,286	775,578
Soda phosphate.....	3,555	202,476	2,949	156,204	3,986	195,751

Table 310.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1931-1934

Years	Superphosphate		Phosphate rock	
	Short tons	Value	Short tons	Value
		\$		\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133

Table 311.—World Production of Phosphate Rock

(Supplied by Imperial Institute)

(Long tons)

Producing country	1932	1933	1934	Producing country	1932	1933	1934
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Tanganyika.....			205	U.S.S.R. (Russia) (d)....			
Seychelles (exports).....	13,989	12,113	11,871	Algeria.....			
Union of South Africa.....	1,164	1,163	76	Egypt.....	344,256	433,673	431,016
Canada.....	1,175	1,977	72	Madagascar.....	7,012	13,000	8,298
India.....	121	37	59	Morocco (French).....	988,162	1,048,822	1,171,150
Christmas Island.....	84,197	91,280	128,010	Tunis.....	1,651,000	1,780,000	1,738,000
Australia.....	869	96	207	Netherland West Indies			
Nauru Island.....	418,180	363,680	418,950	(exports).....	63,390	84,199	99,038
Ocean Island.....	196,875	185,575	211,250	United States.....	1,739,197	2,309,269	2,871,099
Total.....	717,000	656,000	771,000	French Indo-China.....	400		4,000
FOREIGN COUNTRIES				China.....	8,000	(a)	(a)
Belgium (b).....	25,402	24,733	(a)	Japan.....	18,461	34,193	(a)
Estonia.....	1,115	8,809	10,441	Netherlands East Indies..	2,681	7,821	4,934
France.....	81,400	70,000	78,000	Philippine Islands (c)....	817	3,048	(a)
Germany (Prussia).....	(a)	(a)	723	Angaur Island (exports)...	54,347	73,250	63,783
Poland.....	(a)	6,250	(a)	Makatea.....	118,745	77,797	80,700
Spain.....	9,822	14,278	(a)	New Caledonia.....	1,000	6,000	2,000
	100,000	200,000	376,000	Total.....	5,800,000	6,700,000	7,500,000
	560,288	578,470	523,804	World's total.....	6,500,000	7,400,000	8,300,000

(a) Information not available.

(b) In addition phosphatic chalk was produced as follows:—

1932.....51,740 long tons
 1933.....59,840 "

(c) Including guano.

(d) Apatite concentrate. In addition a quantity of low grade phosphate rock is produced.

POTASH

Natural potash salts are not yet mined or recovered on an extensive commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland county N.S., and at Gautreau, Westmoreland county, N.B. A search for beds of economic importance has been made and results so far obtained have been sufficiently promising to warrant future work. Potassium chloride so far opened up at Malagash occurs in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite. Small shipments of potash-bearing salt have been made recently from the Malagash deposit; this salt was employed as a fertilizer.

A review of the current position of the United States as a potash producer appearing in "Engineering and Mining Journal," New York, states that on the discovery of sylvite, potassium chloride in New Mexico, in 1925, sufficient financial interest was aroused to bring about a new era in American potash production by 1932. To-day private enterprise has developed the deposits in the Carlsbad area for a production of more than one million tons of crude salts annually. . . . The United States Potash Company has two shafts about 1,000 feet deep. The refinery can produce 400 tons of refined muriate per day. The Potash Company of America has one shaft completed to a depth of 1,100 feet, a concentrating plant for the separation of sylvite from halite by ore dressing methods will use a process developed co-operatively with the United States Bureau of Mines.

According to the "Chemical Trade Journal and Chemical Engineer," London, German sales of potash in 1934 increased by 30.2 per cent to 1,220,272 metric tons of pure potash; of the 1934 sales 70.4 per cent were taken by domestic consumers while export sales advanced from 23.6 per cent to 29.6 per cent; the average value of sales fell substantially last year and has now reached a low record for many years. Under the increasing competition of Spanish and American producers, export prices in 1934 declined by another 32 per cent, following a fall of around 40 per cent from 1929 to the end of 1933. It is also reported that the Franco-German Potash Cartel have made considerable progress towards the exploitation of the potash deposits which they possess in Catalonia in Spain; wells are being sunk at the Fordina and the Minerva mines, but the crude salts from both mines will be dealt with at one concentration plant.

Palestine Potash Limited which began to produce bromine in 1931 from the Dead Sea is now reported to be supplying 74 per cent of the total consumption of the United Kingdom market; in 1933 an extension of the area of evaporating pans and of the refinery was undertaken and has now been completed in order to raise capacity to 25,000—30,000 tons of potash per annum. The company intends, in due course, to construct or co-operate with others in the construction of an aerial ropeway some 19 miles in length from the north end of the Dead Sea to Jerusalem, whence the products will be transported by rail to Jaffa, Haifa and Port Said.

Imports of kainite, or German potash salts and German mineral potash during 1934 totalled 68,349 cwt. valued at \$17,112 as compared with 83,783 cwt. at \$71,340 in 1933. Crude muriate of potash imports in 1934 amounted to 454,777 cwt. valued at \$489,999 as against 280,359 cwt. worth \$497,890 in 1933. Imports of crude sulphate of potash amounted to 33,947 cwt. valued at \$41,496 in 1934 as compared with 48,936 cwt. at \$103,202 in 1933.

Natro-Alunite.—Natro-alunite occurs at Easy Cove in the Kyuquot section, Quatsino mining division, British Columbia. Small shipments of this mineral have been made from the deposit; the property has been inactive since 1927 when an endeavour was made to develop a trade demand for this product, utilizing its potash content as a fertilizer. For historical tables showing production from this deposit see annual report on Mineral Production of Canada for 1930.

Table 312—Potash Salts Used in the Manufacture of Canadian Mixed Fertilizers, 1933 and 1934

	1933		1934	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Kainite and potash manure salts.....	4,914	92,422	5,822	103,781
Muriate of potash.....	8,320	322,439	10,283	362,460
Sulphate of potash.....	1,515	63,184	1,979	76,474

Table 313.—World Production of Potash

(Supplied by *Imperial Institute*)

(Long tons)

Producing country and description	1932	1933	1934	K ₂ O content or equivalent		
				1932	1933	1934
BRITISH EMPIRE						
Palestine—						
Chloride, 80% KCl.....	9,009	11,461	14,013	5,680	7,230	8,840
Carnallite.....	10,000	(a)	(a)	5,000	(a)	(a)
India—						
Nitrate (estimated).....	9,000	9,900	9,000	4,300	4,800	4,300
Total (estimated).....				9,300	12,000	13,100
FOREIGN COUNTRIES						
France (c)—						
K ₂ O equivalent—						
Sylvinite, etc.:						
12—16%.....	109,158	131,015	118,810	321,314	321,353	372,946
18—22%.....	385,573	497,692	463,180			
30—40%.....	94,553	122,277	168,903			
50% and over.....	336,677	284,039	323,583			
Germany—						
Kainite, sylvinite, etc.....	5,688,310	6,614,188	8,656,471	797,314	945,654	(b)
Carnallite, etc.....	625,896	632,298	808,384	60,278	64,254	1,200,854
Italy—						
Leucite.....	43,000			(a)		
Alunite.....	700	526	(a)	70	50	(a)
Poland—						
Kainite.....	44,108	61,549	84,811	4,900	57,387	10,200
Sylvite.....	249,996	232,870	210,528	74,400		50,500
Langbeinit.....			1,447			300
Spain—						
Chlorides, etc.....	99,776	238,660	(a)	53,945	89,674	137,369
Nitrified earth.....	738	500	(a)	(a)	(a)	(a)
U.S.S.R. (Russia) (d)—						
Chloride, 85% KCl.....	(a)	34,962	149,697	(a)	30,500	93,500
“ 98% KCl.....	(a)	1,322	7,864			
Mixed 65% KCl.....	(a)	21,808	102,211			
Egypt—						
Crude salts.....	8	4		(a)	(a)	
United States—						
Crude salts.....	127,786	297,420	246,189	55,348	128,016	128,877
Korea—						
Alunite (impure).....	16,062	26,790	55,439	(a)	(a)	(a)
Total.....				1,370,000	1,640,000	2,000,000
World's total.....				1,380,000	1,650,000	2,000,000

(a) Information not available.

(b) Sales.

(c) Crude salts mined were as follows—1932—1,889,721 long tons.

1933—2,162,000

1934—2,021,942

(d) Sylvinite (22% KCl) mined was—1933— 298,306

1934— 985,780

PYRITES (Sulphur)

Census returns for 1871 record a production of 2,800 tons of pyrites in Canada, made up of 2,300 tons from Quebec deposits and 500 tons from Ontario. However, it is only since 1886 that a continuous official record of pyrites production is available. Customs' records for the period 1881 to 1885 inclusive, show exports of 120,126 tons of pyrites to the United States. The 1886 output of pyrites was 42,906 tons, all of which was obtained from the Albert and Crown mines, Sherbrooke county, Quebec. In 1889, the production totalled 72,225 tons; shipments ranged from 27,687 tons to 158,566 tons during the following 24 years. The war years, 1914-1918, brought about an increased demand for sulphuric acid and a consequent advance in the production of pyrites. Shipments during this period reached a grand total of 1.6 million tons or approximately 46 per cent of the total Canadian production from 1886 to 1927.

It has been the practice of the Bureau in past years to report export shipments of pyrites in terms of the sulphur content of the pyrites. In view of the fact that there is now an important production of sulphur in the form of sulphuric acid made from waste bessemer gases, it has been decided to modify the method of reporting production to show the total sulphur content of the pyrites shipped and in bessemer gases used in the manufacture of sulphuric acid.

The sulphur content of pyrites shipped and sulphur recovered from non-ferrous smelter gas amounted in 1934 to 51,537 tons valued at \$515,502 as compared with 57,373 tons worth \$510,299 in 1933. Production during both years came from the provinces of Quebec, Ontario and British Columbia.

Sulphur employed in the manufacture of sulphuric acid was recovered from salvaged smelter gas in Ontario and British Columbia. In the former province, Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur gases from the International Nickel Company's smelter, while in British Columbia the Consolidated Mining and Smelting Company of Canada, Ltd., manufactured sulphuric acid through the treatment of by-product gases at the Trail metallurgical plants; this company announced early in 1935 that the new sulphur dioxide recovery process, recently developed, was about ready for the next step, which will consist of building a commercial plant and that plans and estimates for this unit were being prepared, it is reported elemental sulphur will be produced in this plant.

In Boischatel township, Quebec, Aldermac Mines Limited produced both copper and iron pyrites concentrates, the copper concentrates going to the Noranda smelter and the sulphur concentrates to the chemical industry. Iron pyrites concentrates continued to be produced at Eustis, Quebec, by the Consolidated Copper and Sulphur Co. Ltd.; these were exported to the United States. At Britannia Beach in British Columbia the Britannia Mining and Smelting Company Limited shipped pyrites concentrates to a Canadian plant for the manufacture of sulphuric acid.

"Canadian Chemistry and Metallurgy" gives the following information relating to the recovery of sulphur dioxide in England: "The Billingham process now uses a liquor containing a mixture of salts in their large-scale experiment. This solution will absorb 6 per cent of its weight of sulphur dioxide from 6.5 per cent of gas with 98 per cent absorption of the sulphur dioxide in the gas, and on heating to 100 deg. C. it yields practically pure sulphur dioxide. . . . The process has other possibilities beside the production of sulphur from metallurgical gases. In the first place sulphur from anhydrite becomes a practical possibility, as the I.G. and I.C.I. have both produced sulphur dioxide from anydrite by heating with clay and carbon. The second probable development would be in the method of handling pyrites. Ore may be split into its important constituents at the mine or at importing centres. All these possibilities deserve attention and are of interest to Canadian mining; but from the national viewpoint, this research is most significant to the smelter and paper industries."

It is interesting to note that a Canadian chemical works is now using sulphite liquor obtained from a Canadian pulp and paper plant and it is believed that this latter plant is the first of its kind to evaporate sulphite liquor commercially in Canada.

Canadian quotations for sulphur, August, 1935—sulphur ground, 100 pounds \$2.50—\$2.75; car lots, Montreal, per ton, \$27.00 to \$28.00; roll 100 pounds, \$3.50 to \$3.75. Pyrites per long ton unit of sulphur, C.I.F., United States ports, guaranteed 48 per cent sulphur; Spanish, 12 to 12½ cents, nominal.

Table 314.—Production of Pyrites† in Canada, 1925-1934

(For the years 1886 to 1924, see Mineral Production of Canada, 1928)

Year	Pyrites	Sulphur content	Value	Year	Pyrites	Sulphur content	Value
	Tons	Tons	\$		Tons	Tons	\$
1925.....	15,605	7,587	58,899	1930.....		37,730	314,835
1926.....	17,845	8,975	63,899	1931.....		50,107	429,457
1927.....	50,863	25,229	198,388	1932.....		53,172	470,014
1928.....	68,836	38,589	321,033	1933.....		57,373	510,299
1929.....		42,781	350,843	1934.....		51,537	515,502

† Since 1928 includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making and also elemental sulphur produced at Trail, B.C. since 1933.

Table 315.—Production in Canada, Imports and Exports of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid Made from Smelter Gases, 1933 and 1934

—	Pyrites†			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
1933			\$		\$		\$
Quebec.....	39,320	19,167	146,261	.....	.....	19,167	146,261
Ontario.....	.....	.....	.....	8,196	81,960	8,196	81,960
British Columbia.....	19,284	9,011	72,088	20,999	209,990	30,010	282,078
Canada.....	58,604	28,178	218,349	29,195	291,950	57,373	510,299
1934							
Quebec.....	9,868	4,908	50,398	.....	.....	4,908	50,398
Ontario.....	.....	.....	.....	14,598	145,980	14,598	145,980
British Columbia.....	*27,288	(a) 593	4,744	31,438	314,380	32,031	319,124
Canada.....	37,156	5,501	55,142	46,036	460,360	51,537	515,502

	1933		1934	
	Tons	\$	Tons	\$
IMPORTS—				
Brimstone or sulphur, crude or in roll or flour.....	140,810	2,529,920	157,697	2,589,311
Sulphuric acid.....	58	8,493	82	9,938
EXPORTS—				
Sulphur contained in pyrites.....	15,347	121,280	9,821	94,623
Sulphuric acid.....	1,013	17,552	953	13,272

* Includes 26,089 tons shipped for fluxing only.

† Includes iron pyrites concentrates made from copper ores.

(a) Sulphur content of pyrites used for acid manufacture only.

Table 316.—Sulphur (x) Used in Canadian Chemicals and Allied Products and Wood Paper-Pulp Industries, 1931-1934

—	Chemicals and allied products		Wood paper-pulp	
	Pounds	Value	Tons	Value
		\$		\$
1931.....	32,823,534	371,413	129,402	3,118,471
1932.....	21,207,500	228,805	105,521	2,495,137
1933.....	26,703,964	300,564	121,400	2,828,686
1934.....	37,439,226	405,428	127,541	2,932,923

(x) Does not include use of sulphur recovered from smelter gases.

Table 317.—World Production of Pyrites* (including Cupreous Pyrites)

(Supplied by Imperial Institute)

(Long tons)

Producing country	1932	1933	1934	Estimated sulphur content		
				1932	1933	1934
BRITISH EMPIRE						
United Kingdom.....	992	1,132	2,145	(a)	(a)	(a)
Southern Rhodesia.....	268	10,905	11,528	100	4,400	4,600
Union of South Africa.....	3,382	3,606	15,518	1,500	1,600	6,900
Canada (c).....	46,464	52,325	(a)	23,175	25,159	(a)
Cyprus.....	161,172	211,494	199,472	80,586	105,807	99,736
Australia.....	274	1,498	12,030	(a)	(a)	(a)
Total.....	213,000	281,000	(a)			
FOREIGN COUNTRIES						
Bulgaria.....			20			9
Czechoslovakia.....	15,393	15,182	17,637	6,465	6,377	7,408
Finland (e).....	35,668	37,201	70,043	16,407	17,112	32,220
France.....	187,767	165,762	152,663	85,675	74,700	68,000
Germany.....	172,449	186,652	226,513	74,154	80,287	97,500
Greece.....	85,397	181,529	(a)	41,502	88,331	(a)
Italy.....	508,796	721,129	799,565	233,944	330,421	366,000
Norway.....	715,538	850,921	945,722	313,951	376,692	418,009
Poland.....		61	(a)		(a)	(a)
Portugal.....	234,116	207,333	215,937	110,000	100,000	100,000
Roumania.....	5,543	13,800	3,939	2,300	6,364	1,700
Spain.....	2,091,761	2,183,866	(a)	1,200,000	1,300,000	(a)
Sweden.....	70,404	84,932	98,984	27,521	32,960	39,461
Yugoslavia.....	15,470	17,489	22,177	6,400	7,300	10,000
U.S.S.R. (Russia).....	(a)	372,200	375,900	(a)	(a)	(a)
Algeria.....	20,825	15,872	13,425	9,576	7,364	6,200
United States (b).....	189,703	284,311	432,524	66,432	107,778	167,645
Japan.....	714,606	888,865	1,040,565	290,000	(a)	(a)
Korea.....	7,017	14,289	39,392	(a)	(a)	(a)
"Manchoukuo".....	3,563	(a)	(a)	1,300	(a)	(a)
Total.....	(d) 5,100,000	6,200,000	(a)			
World's total.....	(d) 5,300,000	6,500,000	(a)			

* See also Sulphur (page 369).

(a) Information not available.

(b) Includes by-product pyrite from zinc operations in Wisconsin and New York, and pyrite and pyrrhotite concentrates from copper operations in Tennessee.

(c) Includes pyrite ore, also concentrates made from copper ores.

(d) Excluding U.S.S.R. (Russia).

(e) Pyrite concentrate only.

SULPHURIC ACID

Production of sulphuric acid in Canada during 1934 at 205,325 short tons was the highest reported for any year and exceeded the 148,142 tons of 1933 by 38·6 per cent and the 136,846 tons of 1932 by 50 per cent. The improvement over other years was accounted for by an increased output at Trail, B.C., for use in making fertilizers and at Copper Cliff in Ontario where nitre cake is made for use in the nickel smelter at that point.

Sales of sulphuric acid by the producers during 1934 totalled 80,329 tons worth \$1,082,498 and stocks on hand on December 31 amounted to 15,488 tons. The remainder of the output was used in the producers' own works.

An estimate of the Canadian consumption of sulphuric acid may be made by adding the production of 205,325 tons to the imports of 32 tons and deducting the exports of 953 tons. This calculation shows that the apparent consumption in 1934 totalled 204,404 tons.

Table 318.—Production, Imports, Exports and Apparent Consumption of Sulphuric Acid in Canada, 1923-1934

(Short tons)

Years	Pro- duction	Imports	Exports	Apparent con- sumption(x)
1923.....	87,150	291	12,203	75,238
1924.....	71,991	47	7,678	64,360
1925.....	83,396	51	19,179	64,268
1926.....	108,229	53	28,136	80,146
1927.....	98,470	53	17,407	81,116
1928.....	96,227	54	13,329	82,952
1929.....	110,748	111	8,397	102,462
1930.....	107,352	150	571	106,931
1931.....	119,540	80	996	118,624
1932.....	136,846	62	721	136,187
1933.....	148,142	58	1,013	147,187
1934.....	205,325	82	953	204,454

(x) No allowance made for changes in stocks on hand.

SILICA BRICK

Production of silica brick in Canada during 1934 totalled 2,528 thousand valued at \$85,945 as compared with 636 thousand worth \$23,185 in 1933. The output in 1934 as for 1933 came from the plants of the Dominion Steel and Coal Corporation, Sydney, Nova Scotia, and the Algoma Steel Corporation, Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized as a refractory in furnace construction.

Imports of silica brick containing not less than 90 per cent silica were evaluated at \$210,190 in 1934 as compared with \$147,901 in 1933.

Table 319.—Production of Silica Brick in Canada, 1925-1934

Year	M	Value	Year	M	Value
		\$			\$
1925.....	Not a	available	1930.....	2,418	97,379
1926.....	2,665	130,702	1931.....	900	35,746
1927.....	1,791	79,527	1932.....	93	4,304
1928.....	3,224	155,502	1933.....	636	23,185
1929.....	3,951	173,581	1934.....	2,528	85,945

SODIUM CARBONATE (NATURAL)

Sales in 1934 of natural sodium carbonate produced from Canadian deposits totalled 244 tons valued at \$1,920 as compared with 559 tons worth \$5,773 in 1933. The 1934 shipments were made from the property of the B. C. Sodium Syndicate located on a small lake near Cherry Creek in the Kamloops mining division of British Columbia. The British Columbia Department of Mines reported that experimental work on this product and also on a sodium-sulphate deposit in an adjoining lake was continued in 1934 and considerable interest has been attracted to the possibilities of erecting a soda ash and sulphate plant at this point. Equipment is being enlarged and an increase in production was expected in 1935.

Imports of soda ash or barilla into Canada in 1934 totalled 2,311,498 pounds valued at \$32,258 as compared with 1,616,483 pounds worth \$23,256 in 1933. Bicarbonate of soda imports in 1934 amounted to 11,918,011 pounds valued at \$205,058.

Sodium carbonate, or soda ash, has many industrial uses, being employed in the manufacture of glass, soap, and in the purification of oils, etc.

Table 320.—Production* of Sodium Carbonate (Natural) in Canada, 1925-1934

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	1,120	8,140	1930.....	364	4,550
1926.....	595	5,370	1931.....	712	7,351
1927.....	805	9,995	1932.....	495	5,450
1928.....	519	4,922	1933.....	559	5,773
1929.....	600	8,100	1934.....	244	1,920

* Output confined to British Columbia.

Table 321.—Consumption of Soda Ash in the Canadian Chemicals and Allied Products Industries and Manufactures* of Non-Metallic Minerals, 1931-1934

Year	Chemical industry		Manufactures of Non-metallic minerals	
	Pounds	Value	Pounds	Value
		\$		\$
1931.....	12,439,458	201,654	47,763,713	694,806
1932.....	11,421,879	193,422	43,545,840	598,884
1933.....	12,221,928	191,639	38,336,000	505,152
1934.....	21,879,170	327,214	49,260,000	644,655

* Includes coke and gas, glass and petroleum refining.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Natural sodium sulphate occurs in deposits of considerable magnitude in Western Canada. In 1934, as for some years past, the entire Canadian production came from the province of Saskatchewan. The output in 1934 totalled 66,821 tons valued at \$587,986 as compared with 50,080 tons worth \$485,416 in 1933 and the quantity and value of the 1934 production represent all time high records for this particular industry.

Sodium sulphate finds its principal use in the pulp and paper industry for the manufacture of "kraft paper" by the sulphate process, in the manufacture of glass, in the dyes industry, in the smelting of nickel-copper ores, and as one of the raw materials in the manufacture of sodium carbonate.

A recent report by the Department of Mines, Ottawa, states that: "There are several new developments in Western Canada in the sodium sulphate industry, a company is erecting a dehydrating plant near Oban, Saskatchewan, and plans to use material obtained from Whiteshore Lake; at the central part of Whiteshore lake another company has erected a 50-ton dehydrating plant using a direct rotary drier and Alberta interests have taken up leases on Muskiki lake, 60 miles west of Saskatoon, Saskatchewan, they propose using a modification of the solution and crystallization process. . . . The investigation of Western Canada sodium sulphate deposits was started by the Mines Branch in 1921 and over 120,000,000 tons of hydrous salts were proven up in the few deposits examined in detail."

Imports of sulphate of soda (salt cake) into Canada during 1934 totalled 21,154,815 pounds valued at \$123,980 as compared with 5,191,036 pounds worth \$34,371 in 1933. Imports of Glauber's salts in 1934 totalled 1,266,665 pounds valued at \$8,853.

Table 322.—Production of Natural Sodium Sulphate in Canada* 1925-1934

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1925.....	3,876	19,380	1930.....	31,571	293,847
1926.....	6,775	13,550	1931.....	44,957	421,097
1927.....	5,659	11,319	1932.....	22,466	271,736
1928.....	6,016	68,804	1933.....	50,080	485,416
1929.....	5,018	64,112	1934.....	66,821	587,986

* Produced entirely in Saskatchewan.

Table 323.—Salt Cake Used in the Manufacture of Canadian Wood Paper-Pulp and in the Acids, Alkalies and Salts Industry, 1931-1934

Year	Acids, alkalies and salts industry		Wood paper-pulp	
	Tons	Value	Tons	Value
		\$		\$
1931.....	15,602	221,748	24,756	503,560
1932.....	94	1,811	24,301	489,343
1933*.....	9,968	146,201	29,563	580,251
1934.....	26,075	368,576	34,559	655,905

* Includes 39 tons valued at \$4,879 used in medicinal and pharmaceutical preparations. In addition to the consumption listed above, there is a relatively large quantity of natural sodium sulphate employed in the manufacture of nitre cake for use in the nickel-copper mining and smelting industry.

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain, Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported-Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, Slate and Stone.

Increases in Canadian population, national development and general industry during the years immediately preceding the commencement of the world economic crisis in 1929 were distinctly reflected by expansion in production of clay products and other structural materials. Economic factors, international in scope, and restrictive in nature, as largely existing since 1929 have unfortunately resulted in almost continuous recessions in the outputs of these particular materials. During the twenty-two years from 1907 to 1929 the valuation of these commodities increased from \$12,863,049 to \$58,534,834. In 1930 the value had fallen to \$53,727,465, later declining to \$16,696,687 in 1933. Evidence of recovery in the building trades and construction since 1933 is apparent in an increase in the value of production of structural materials to \$19,286,761 in 1934.

Contracts awarded for building in Canada in 1912 as reported by MacLean Building Review were valued at \$463,083,000. In 1913 contracts awarded totalled \$384,157,000 which was followed in the succeeding year by a decrease to \$241,952,000. During the war years (1915-1918) construction was largely neglected and the value remained below the one hundred million dollar mark. A revival of building was experienced during the immediate post war period, the value of contracts awarded rising to an all-time high record of \$576,651,800 in 1929. During the years of the recent economic depression the value declined to \$97,289,800 in 1933 and it is encouraging to note the distinct improvement in construction activities as indicated in an increase to \$125,811,500 in the value of construction contracts awarded in 1934. These figures, when compared with data relating to production of non-metallic minerals, emphasize the intimate relationship existing between the construction and structural materials industries.

Table 324.—Value of Construction Contracts in Canada, 1932-1934

(Supplied by *Engineering and Contract Record*—Toronto)

	1932	1933	1934
	\$	\$	\$
Maritimes.....	9,339,500	7,218,700	9,968,600
Central Canada.....	101,817,100	75,112,600	97,493,800
Total Eastern Canada.....	111,156,600	82,331,300	107,462,400
Prairies.....	13,156,900	5,739,100	8,957,600
British Columbia.....	8,558,900	9,219,400	9,391,500
Total Western Canada.....	21,715,800	14,958,500	18,349,100
Total Canada.....	132,872,400	97,289,800	125,811,500

Table 325.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1931-1934

Province	1931	1932	1933	1934
	\$	\$	\$	\$
Nova Scotia.....	970,933	432,075	378,320	511,026
New Brunswick.....	630,542	779,492	644,570	669,726
Quebec.....	18,104,022	8,062,951	5,747,715	6,115,682
Ontario.....	15,225,817	8,827,968	7,340,086	8,988,681
Manitoba.....	2,534,749	1,259,733	667,012	761,742
Saskatchewan.....	562,964	176,681	111,938	260,030
Alberta.....	2,185,839	1,039,093	654,334	843,629
British Columbia.....	3,943,429	1,820,290	1,152,712	1,136,245
Canada.....	44,158,295	22,398,283	16,696,687	19,286,761

Table 326.—Production, Imports, Exports, and Apparent Consumption of Clay Products and Other Structural Materials in Canada, 1932-1934

Item		Production	Imports	Exports	Apparent consumption
		\$	\$	\$	\$
Cement, Portland.....	1932	6,930,721	†64,975	38,921	6,956,775
	1933	4,536,935	†42,739	47,369	4,532,305
	1934	5,667,946	†49,715	55,181	5,662,480
Clay and clay products.....	1932	3,650,218	5,405,750	196,494	8,859,474
	1933	2,262,835	4,961,265	141,552	7,082,548
	1934	2,680,410	5,935,805	186,359	8,429,856
Lime.....	1932	2,394,537	6,241	188,329	2,212,449
	1933	2,432,306	4,444	192,029	2,244,721
	1934	2,745,797	5,118	151,983	2,598,932
*Sand and gravel.....	1932	4,480,596	211,546	33,620	4,658,522
	1933	4,464,285	232,611	15,801	4,681,095
	1934	4,035,477	283,088	17,079	4,301,486
Slate.....	1932	3,750	(a) 57,931		61,681
	1933	3,750	(a) 30,567		34,317
	1934	4,802	(a) 40,966		45,768
Stone.....	1932	4,938,461	328,521	124,807	5,142,175
	1933	2,996,576	243,930	91,340	3,149,166
	1934	4,152,329	447,658	104,969	4,495,018
Total.....	1932	22,398,283	6,074,964	582,171	27,891,076
	1933	16,696,687	5,515,556	488,091	21,724,152
	1934	19,286,761	6,762,350	515,571	25,533,540

* Sand and gravel imports include silica sand for glass and carborundum manufacture and for use in steel plants. This silica sand was valued at \$162,869 in 1932, \$160,131 in 1933 and \$226,188 in 1934.

† Includes cement manufactures.

(a) Includes slate manufactures.

CEMENT

Shipments from Canadian cement plants during 1934 totalled 3,783,226 barrels valued at \$5,667,946 as compared with 3,007,432 barrels worth \$4,536,935 in 1933, the value of the 1934 sales representing an increase of 24.9 per cent over those of the preceding year.

Cement was produced in 1934 at plants located in Quebec, Ontario, Manitoba, Alberta and British Columbia and increases in both quantity and value of cement sales over 1933 were recorded in all of these provinces. The cement mills of Quebec and Ontario are now contributing by far the greater part of Canada's cement production.

The increase in output in 1934 was reflected in the pronounced improvement experienced in employment throughout the cement industry; for the year under review a total of 860 persons were employed and the industry distributed \$1,009,686 in salaries and wages. These figures represent increases of 16.2 per cent in employees and 29.2 per cent in salaries and wages as compared with 1933. Limestone consumed in 1934 amounted to 806,546 tons, an increase of 30.9 per cent over the preceding year. Coal used by the industry totalled 69,853 tons of Canadian and 60,877 tons of foreign as against 48,905 tons of Canadian and 46,955 tons of foreign in 1933.

Both wet and dry processes were employed and 41 rotary kilns, with a total daily capacity of 43,722 tons, were utilized. Selling prices, f.o.b. works, in 1934 were \$2.36 high and \$1.25 low as compared with a high and low of \$2.55 and \$1.25 respectively in 1933.

Exports of cement in 1934 totalled 70,046 barrels valued at \$55,181 as compared with 52,531 barrels worth \$47,369 in 1933. Overseas shipments of Canadian cement in 1934 went to various countries, including British Guiana, Trinidad, Newfoundland, and Australia.

"A feature about concrete construction is that, for the most part, concrete is manufactured at the site of the work, although in recent years there has been a noted tendency toward the use of pre-mixed or transit-mixed concrete which requires no job mixing but simply placing in the forms. In either case the material is a fully Canadian commodity in which there is no foreign element, either of labour or material. Even the formwork is Canadian, making use of Canadian lumber set up in place by local workmen. Many large and important buildings, bridges, and

other structures and many miles of roads in Canada have been built of concrete in recent years. So well established, indeed, has concrete become that there is never any question of its stability, strength and longevity. Canadian engineers have kept to the forefront in the assimilation and application of the knowledge that research and practical application are making known about concrete (and cement), and Canadian contractors have shown initiative and enterprise in the handling of concrete under all sorts of conditions, including severe winter weather. Concrete has thus become definitely fixed as a Canadian structural material through the co-operative efforts of cement manufacturers, aggregate producers, steel reinforcing manufacturers, lumber manufacturers, engineers and contractors.

"Last year, for the first time, cement bound macadam roads became a factor in the road construction programme of Canada, and although the mileage built was small, there is evidence that the interest in the cement bound macadam type of pavement will greatly increase. It has many merits that make it highly suitable for low-cost highways and is now being adopted in the United States by a rapidly increasing number of road authorities."⁽¹⁾

It was announced by the British Technical Press in June, 1935, that negotiations for the projected formation of a central propaganda organization for the cement industry were nearing completion. It was understood that an annual subscription related to output will be paid into a common fund by all members adhering to the cement agreement. This agreement embraces practically all the cement manufacturers of Great Britain and Northern Ireland.

(1) Engineering and Contract Record—Toronto.

Table 327.—Capital Employed in the Cement Industry in Canada, 1933 and 1934

	1933	1934
	\$	\$
Capital employed as represented by:		
(a) Present value of land, buildings, plant, machinery and tools (estimated value if rented)....	49,207,078	48,113,855
(b) Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	1,080,568	1,052,187
(c) Inventory value of finished products on hand.....	1,199,073	1,175,361
(d) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	2,916,600	3,071,597
Total.....	54,403,379	53,413,000

Table 328.—Employees, Salaries and Wages in the Cement Industry in Canada, 1933 and 1934

Class	1933		1934	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
		\$		\$
SALARIED EMPLOYEES.....	85	160,680	84	161,118
WAGE-EARNERS.....	655	621,066	776	848,568
Total.....	740	781,746	860	1,009,686

Table 329.—Wage-Earners on 15th of Each Month or Nearest Representative Date, 1933 and 1934

Month	1933	1934
January.....	618	556
February.....	609	565
March.....	606	561
April.....	628	685
May.....	482	846
June.....	558	885
July.....	632	965
August.....	815	883
September.....	787	861
October.....	798	865
November.....	716	844
December.....	584	789

Table 330.—Production and Apparent Consumption of Cement in Canada, 1925-1934

Year	Sold or used		Apparent consumption
	Barrels	Value	Barrels
		\$	
1925.....	8,116,597	14,046,704	7,140,531
1926.....	8,707,021	13,013,283	8,442,203
1927.....	10,065,865	14,391,947	9,835,525
1928.....	11,023,928	16,739,163	10,790,650
1929.....	12,284,081	19,337,235	12,105,950
1930.....	11,032,538	17,713,067	10,977,238
1931.....	10,161,658	15,826,243	10,085,986
1932.....	4,498,721	6,930,721	4,466,738
1933.....	3,007,432	4,536,935	2,974,020
1934.....	3,783,226	5,667,946	3,727,521

Table 331.—Output, Sales, Imports, Exports and Consumption of Cement in Canada, 1932-1934

	1932		1933		1934	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
OUTPUT.....	4,643,675		2,410,518		3,484,233	
SOLD OR USED.....	4,498,721	6,930,721	3,007,432	4,536,935	3,783,226	5,667,946
STOCKS, DEC. 31.....	2,431,881		1,830,928		1,562,501	
IMPORTS—						
Portland cement.....	21,350	58,092	19,119	37,768	14,341	45,548
Manufactures.....		6,883		4,971		4,167
EXPORTS PORTLAND CEMENT.....	53,333	38,921	52,531	47,369	70,046	55,181
APPARENT CONSUMPTION.....	4,466,738		2,974,020		3,727,521	

1 barrel=350 pounds.

Table 332.—Producers Sales of Cement in Canada, by Provinces, 1932-1934

Province	1932		1933		1934	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
Quebec.....	2,210,584	3,155,702	1,517,555	2,128,900	1,613,641	2,294,847
Ontario.....	1,599,342	2,288,975	1,095,845	1,587,812	1,702,128	2,403,590
Manitoba.....	242,112	549,594	129,540	295,351	181,166	411,247
Alberta.....	193,571	399,922	149,206	299,530	163,946	326,253
British Columbia.....	253,112	536,528	115,286	225,342	122,345	232,009
Canada.....	4,498,721	6,930,721	3,007,432	4,536,935	3,783,226	5,667,946

Table 333.—Kilns Used by Canadian Cement Industry, 1930-1934

Year	Rotary	Vertical	Total daily capacity
	No.	No.	Barrels
1930.....	57	.....	37,522
1931.....	43	1	42,422
1932.....	47	.....	43,822
1933.....	41	.....	43,622
1934.....	41	.....	43,922

Table 334.—Limestone and Gypsum Used in Canadian Cement Plants, 1930-1934

Year	Limestone	Gypsum
	Tons	Tons
1930.....	2,925,399	74,227
1931.....	2,489,147	56,677
1932.....	1,141,376	27,538
1933.....	616,364	13,319
1934.....	806,546	19,172

THE CEMENT PRODUCTS INDUSTRY

Owing to continued dullness in the building and construction trades during 1934 the production of cement products in Canada declined to \$1,042,258, the lowest value reported since the Bureau commenced to gather annual figures in 1919. Corresponding output figures for earlier years were: 1933—\$1,596,998; 1932—\$1,771,297; 1931—\$3,807,188; 1930—\$3,718,704; and 1929—\$4,419,417, the record for the industry.

Quite a number of factories were idle throughout 1934 and others operated for only a few days. Only 88 establishments were included in the compilations for 1934 as compared with 83 in 1933; 54 were in Ontario, 22 in Quebec, 6 in British Columbia, 2 in Saskatchewan, and 1 in each of Nova Scotia, New Brunswick, Manitoba, and Alberta. Works in Ontario accounted for 66 per cent of the total output and factories in Quebec accounted for 29 per cent.

Table 335.—Products Made, by Provinces, 1934

Products	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Cement bricks.....	6,304	7,645	.....	.....	13,949
Hollow building blocks.....	50,737	179,814	125	1,225	231,901
Cement drain pipe, sewer pipe, water pipe and culvert tile	47,819	119,086	8,731	26,709	202,345
Artificial stone.....	53,007	32,314	1,190	.....	86,511
Cement posts, poles, etc.....	.....	6,610	.....	.....	6,610
Cement laundry tubs.....	.....	17,115	4,070	.....	21,185
Cinder blocks.....	4,175	72,509	.....	.....	76,684
Stucco.....	300	8,215	4,000	3,347	15,862
All other products.....	134,974	243,868	2,490	5,879	387,211
Total.....	297,316	687,176	20,606	37,160	1,042,258

CLAY AND CLAY PRODUCTS

The Clay and Clay Products Industry in Canada is classified into two distinct divisions:— (1) production from domestic clays which includes the production of refractories, building brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe, and pottery, and (2) production from imported clays which includes the manufacture of porcelain insulators, refractories, earthenware, pottery and ceramic floor and wall tile. There were 158 plants representing a total capital investment of \$27,208,242 operating in the domestic and imported clay products industries in Canada during 1934. These two industries provided employment for 2,285 persons during the year; their earnings totalled \$1,935,731 and the combined sales in 1934 totalled \$4,603,628 as compared with \$3,467,887 in 1933.

1. PRODUCTION FROM DOMESTIC CLAYS

The value of products made from domestic clay and sold in 1934 totalled \$2,680,410 as against a value of \$2,262,835 in 1933; the 1934 value represents an increase of 18·5 per cent over that for the preceding year and is consistent with an indicated uptrend in construction. Gains over 1933 were particularly pronounced for building brick and various structural tile, shipments of the former totalling 86,072 thousand evaluated at \$1,383,929 as compared with 67,700 thousand at \$1,124,517 in the preceding year and it is especially encouraging to note that increases in total sales of building brick were recorded for each of the various provinces within the Dominion.

Of the total value of the domestic clay products production in Canada, in 1934, Ontario produced 47 per cent; Quebec, 23·6 per cent; Alberta, 9·2 per cent; British Columbia, 7·3 per cent, and the other provinces, in the order of the value of sales, were Nova Scotia, Saskatchewan, New Brunswick and Manitoba.

"A recent Canadian development of considerable interest is the establishment of the fact that materials exist in Canada which will serve as bleaching clays. In the final stages of the production of oils, both mineral and vegetable, it is necessary to subject the oils to a bleaching process. This is accomplished by filtering the oil through earthy materials that have the power to remove the colouring matter present. In previous years it has been necessary for the Canadian oil refining industry to import bleaching materials. . . . Some years ago the Chemistry Division of the Mines Branch, Department of Mines, Ottawa, carried on considerable work to determine the bleaching power of a variety of Canadian clays and bentonites. During the course of the investigation it was found that an acid treatment of some of the materials under investigation produced a marked increase in their bleaching power. More recently the National Research Council of Canada, and the Department of Ceramics of the University of Saskatchewan, launched upon an intensive investigation into the possibilities of Canadian materials for bleaching purposes. This work has now progressed to a point where it may confidently be stated that from sources in Canada materials may be supplied that are equal, if not superior, to the best imported materials for the bleaching of both mineral and vegetable oils. The sources of the best materials now known are in the Western Provinces. . . ." (Abstract from "Outstanding Developments in Ceramics in 1934."—Journal of Canadian Ceramics Society, 1935).

"It is hardly necessary to point out that, since clay is cheaper than oil or fat, the use of colloidal clay in soap-making is a definite economy and at the same time improves the quality of the soap. It may therefore safely claim to be regarded more as a genuine constituent than as a mere filler, still less as an adulterant under which stigma it was placed by Watt in the old days. The colloidal clay of to-day, as prepared by the best methods, is quite a different material and is not only finding increased application in toilet and other soaps, but also cosmetics and toilet preparations generally. . . ."—(The Chemical Age, London).

"Deposits of high-grade, white-burning clays occur on Mattagami, Abitibi and Missinaibi rivers in North Ontario. Some of these clays may be classed as ball clays and others as china clays. Ball clays of high bond strength occur in extensive deposits in Southern Saskatchewan, about 60 miles south of Moose Jaw. . . . There is a large steady demand for various grades of china clay in Canada, for use in the manufacture of paper and rubber as well as in the ceramic industry. Ball clays are used in the ceramic industry as a bonding clay in the manufacture of porcelain and similar compounded bodies. The only place where china clay has been produced commercially in Canada is near St. Remi d'Amherst, Quebec." (Abstracted from Report No. 760—Mines Branch, Department of Mines, Ottawa).

For a classification and the uses of clays consult the annual report on the mineral production of Canada for the year 1932.

In this section all tables show data for the domestic clay products industry only.

Table 336.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1933 and 1934

Industry and province	1933 Capital employed as represented by					1934 Capital employed as represented by				
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
By INDUSTRIES— *Brick and Tile—	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
N. Scotia...	590,908	80,894	102,033	5,937	779,772	592,764	69,147	99,213	12,926	774,050
N. Bruns...	171,939	5,560	20,453	11,766	209,718	178,785	3,164	24,162	17,870	223,981
Quebec....	6,164,864	109,073	398,249	359,066	7,025,252	6,272,812	49,965	449,898	283,793	7,056,468
Ontario....	9,337,816	175,074	911,828	1,437,224	11,861,942	9,323,926	138,660	861,885	1,158,644	11,483,115
Manitoba...	123,301	1,756	37,230	44,406	206,693	123,301	947	23,625	42,256	190,129
S'chewan...	858,138	5,887	59,036	59,760	982,821	221,448	1,563	28,872	59,985	311,868
Alberta....	1,372,599	29,094	183,233	181,432	1,766,358	1,349,624	38,700	161,669	170,291	1,720,284
British C...	674,530	10,914	159,708	82,469	927,621	666,862	10,013	142,631	53,884	873,390
Total for Canada..	19,294,095	412,252	1,871,770	2,182,060	23,760,177	18,729,522	312,159	1,791,955	1,799,649	22,633,285
Stoneware and pottery— Total for Canada..	206,819	26,576	70,374	57,934	451,703	249,117	35,420	64,019	64,966	413,522
By PROVINCES— Total for clay and clay products—										
N. Scotia...	590,908	80,894	102,033	5,937	779,772	592,764	69,147	99,213	12,926	774,050
N. Bruns...	181,805	7,883	27,406	21,193	238,287	188,574	5,507	29,761	31,357	255,199
Quebec....	6,164,864	103,073	398,249	359,066	7,025,252	6,272,812	49,965	449,898	283,793	7,056,468
Ontario....	9,388,816	176,024	921,928	1,466,174	11,952,942	9,378,186	145,560	872,225	1,193,309	11,589,280
Manitoba...	123,301	1,756	37,230	44,406	206,693	123,301	947	23,625	42,256	190,129
S'chewan...	858,138	5,887	59,036	59,760	982,821	221,448	1,563	28,872	59,985	311,868
Alberta....	1,602,352	52,097	233,917	200,116	2,088,482	1,528,492	64,577	206,697	186,105	1,985,871
British C...	680,730	11,214	162,345	83,342	937,631	673,062	10,313	145,683	54,884	883,942
Canada..	19,590,914	438,828	1,942,144	2,239,994	24,211,880	18,978,639	347,579	1,855,974	1,864,615	23,046,807

* Clay, sewer pipe, firebrick, firebrick products and other clays included under Brick and Tile.

Table 337.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1933 and 1934

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1933						
Nova Scotia.....	8	68	76	17,569	29,967	47,536
New Brunswick.....	9	23	32	11,036	12,536	23,572
Quebec.....	52	237	289	93,712	151,123	244,835
Ontario.....	118	508	626	221,295	299,837	521,132
Manitoba.....	5	5	10	9,900	1,611	11,511
Saskatchewan.....	9	22	31	17,447	13,588	31,035
Alberta.....	20	105	125	40,846	90,599	131,445
British Columbia.....	18	105	123	29,161	61,666	90,827
Canada.....	239	1,073	1,312	440,966	660,927	1,101,893
1934						
Nova Scotia.....	9	83	92	18,714	49,280	67,994
New Brunswick.....	8	45	53	9,402	23,044	33,046
Quebec.....	47	305	352	93,235	193,701	286,936
Ontario.....	102	629	731	177,561	410,187	587,748
Manitoba.....	5	2	7	9,800	177	9,977
Saskatchewan.....	8	26	34	15,324	19,497	34,821
Alberta.....	20	147	167	41,536	100,587	142,123
British Columbia.....	16	120	136	24,150	76,182	100,332
Canada.....	215	1,357	1,572	389,722	873,255	1,262,977

* See note page 26.

Table 341.—Production of Building Brick in Canada, by Provinces, 1932-1934

		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1932									
Soft mud process	Face.....	M 160		300	5,716				12
	\$ 2,008			3,000	103,390				184
Common.....	M 540	1,269		18	6,525	1,337	660	697	1,755
	\$ 6,780	18,180		912	98,828	18,166	6,929	8,345	24,232
Stiff mud process (wire cut)	Face.....	M 347	487	13,180	15,315	320	115	277	156
	\$ 6,754	13,628	300,649	323,077	7,472	3,127	6,386	3,663	3,663
Common.....	M 2,229	520	28,063	7,816	416	220	989	500	500
	\$ 31,206	7,949	448,470	122,905	6,861	2,256	11,648	7,627	7,627
Dry press	Face.....	M		319	4,667		6	310	220
	\$			9,563	97,897		138	3,876	8,073
Common.....	M				1,522			2,726	
	\$				24,070			22,692	
Fancy or ornamental brick.....		M		89	36				
\$				4,447	1,790				
Sewer brick.....	M				638				5
	\$				12,071				85
Total.....		M		41,969	42,235	2,073	1,001	4,999	2,648
\$				767,041	784,028	32,499	12,450	52,947	43,864
1933									
Soft mud process	Face.....	M 60			2,292		11		119
	\$ 900				38,360		333		2,144
Common.....	M 480	678		1,241	6,796	1,091	23		2,080
	\$ 5,680	9,992		9,862	87,644	16,035	369		27,187
Stiff mud process (wire cut)	Face.....	M 422	118	7,234	11,660	70	64		17
	\$ 10,233	3,676	153,990	240,738	1,683	624	1,078	345	345
Common.....	M 1,671	411	17,483	3,191		62	711	365	365
	\$ 20,046	6,972	270,433	46,337		641	6,542	5,477	5,477
Dry press	Face.....	M		601	3,302		8	476	157
	\$			18,166	72,194		185	4,557	6,150
Common.....	M				1,834			2,082	
	\$				29,357			15,020	
Fancy or ornamental brick.....		M			6			624	
\$					387			7,437	
Sewer brick.....	M				242				1
	\$				3,683				10
Total.....		M		26,559	29,323	1,161	121	3,957	2,739
\$				452,501	518,700	17,718	2,152	34,634	41,313
1934									
Soft mud process	Face.....	M 40		1,000	3,514	350			
	\$ 600			7,000	64,642	4,005			
Common.....	M 500	1,500		1,580	7,193	1,634	20	763	1,066
	\$ 5,000	19,399		13,349	96,776	25,334	325	9,178	14,224
Stiff mud process (wire cut)	Face.....	M 545	267	7,637	15,060	160	12	87	32
	\$ 11,863	6,846	157,078	311,490	4,224	382	1,601	857	857
Common.....	M 2,695	141	18,404	6,876		173	829	1,199	1,199
	\$ 32,924	2,239	267,622	97,323		1,936	6,189	15,898	15,898
Dry press	Face.....	M		610	4,836		47	374	138
	\$			15,951	103,718		1,290	3,857	5,576
Common.....	M				2,046		13	3,828	553
	\$				33,177		243	26,937	6,259
Fancy or ornamental brick.....		M			14			29	
\$					835			1,790	
Sewer brick.....	M				307				
	\$				5,992				
Total.....		M		29,231	39,846	2,144	265	5,910	2,988
\$				461,000	713,953	33,563	4,176	49,552	42,814

Table 342.—Production of Building Brick in Canada, 1925-1934

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or orna- mental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1925	M	27,701	51,214	93,903	116,105	37,201	22,053	524	2,485	351,186
	\$	521,739	753,970	1,883,856	1,635,257	800,504	270,135	26,320	52,382	5,944,163
1926	M	28,235	78,158	101,028	94,046	30,423	19,450	462	6,546	358,348
	\$	556,573	1,145,490	2,146,362	1,624,055	651,236	260,598	24,057	117,194	6,525,565
1927	M	16,196	70,554	95,480	150,222	39,753	14,617	620	10,997	398,439
	\$	325,966	1,091,274	2,024,064	2,239,180	833,570	187,062	29,372	210,643	6,941,131
1928	M	17,532	93,280	101,717	144,404	36,587	24,294	599	2,838	421,301
	\$	349,847	1,328,981	2,247,472	2,132,307	748,301	337,096	28,763	59,010	7,281,777
1929	M	26,624	77,399	114,093	170,840	38,591	26,131	187	4,765	458,630
	\$	538,096	1,195,511	2,469,417	2,509,451	813,461	368,039	12,795	96,588	8,003,358
1930	M	11,350	56,487	99,284	105,225	29,454	16,915	339	804	319,838
	\$	247,220	861,805	2,135,871	1,480,965	604,197	208,495	27,649	15,299	5,581,501
1931	M	5,476	41,177	77,135	81,930	20,149	8,688	335	2,253	237,143
	\$	116,316	619,357	1,752,947	1,205,464	423,357	107,213	20,773	43,692	4,289,119
1932	M	6,188	12,801	30,197	40,753	5,322	4,248	125	643	100,477
	\$	108,582	182,372	664,756	638,922	119,547	46,762	6,237	12,156	1,779,334
1933	M	2,482	12,389	19,602	23,894	4,544	3,916	630	243	67,700
	\$	41,737	156,769	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517
1934	M	4,904	14,256	23,800	30,317	6,005	6,440	43	507	86,072
	\$	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,992	1,353,929

Table 343.—Production of Paving Brick in Canada, 1923-1934

(For years 1897 to 1922 see previous reports)

Year	Quantity	Value
	M	\$
1923-1925		
1926	122	5,015
1927	50	2,106
1928	338	4,464
1929	97	3,344
1930	9	297
1931	19	682
1932	6	155
1933	1	42
1934	10	382

Table 344.—Production of Structural Tile in Canada, by Provinces, 1932-1934

Province	Hollow blocks (includ- ing fireproofing and load-bearing tile)		Roofing tile		Floor tile (quarries)	
	Tons	Value	No.	Value	Sq. ft.	Value
1932		\$		\$		\$
Nova Scotia	3,162	30,208				
New Brunswick	134	1,120				
Quebec	20,170	193,335				
Ontario	18,941	144,471	48,939	3,900	94,316	21,502
Manitoba	1,167	11,965				
Saskatchewan	1,322	11,781				
Alberta	2,106	17,055				
British Columbia	1,116	11,737				
Canada	48,118	421,672	48,939	3,900	94,316	21,502
1933						
Nova Scotia	1,759	17,590				
New Brunswick	65	631				
Quebec	7,676	66,197				
Ontario	8,196	60,438	20,469	1,136	81,808	12,490
Manitoba	44	532				
Saskatchewan	201	2,210				
Alberta	628	5,637			9,687	1,807
British Columbia	8,178	6,824				
Canada	26,747	160,059	20,469	1,136	91,495	14,297
1934						
Nova Scotia	1,068	10,955				
New Brunswick	151	1,276				
Quebec	13,668	107,675				
Ontario	13,576	102,243	44,115	1,852	77,604	16,886
Manitoba	158	1,941				
Saskatchewan	4	45				
Alberta	1,436	10,438			2,752	605
British Columbia	1,075	9,549				
Canada	31,136	244,122	44,115	1,852	80,356	17,491

Table 345.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1925-1934

(For the years 1888 to 1924 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	73,791	1,440,269	1930.....		1,721,815
1926.....	75,996	1,480,776	1931.....		1,508,803
1927.....	77,262	1,475,875	1932.....		813,224
1928.....		1,723,644	1933.....		354,458
1929.....		2,005,887	1934.....		436,433

Table 346.—Production of Drain Tile in Canada, 1925-1934

(For the years 1891 to 1924 see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1925.....	14,552	401,503	1930.....	25,291	687,070
1926.....	14,258	396,018	1931.....	12,518	328,410
1927.....	22,259	598,098	1932.....	7,385	180,670
1928.....	22,629	656,054	1933.....	10,057	222,829
1929.....	25,000	720,316	1934.....	7,325	180,553

Table 347.—Production of Drain Tile and Sewer Pipe, in Canada, by Provinces, 1933 and 1934

Province	1933				1934			
	Drain tile		†Sewer pipe		Drain tile		†Sewer pipe	
	M	\$	Tons	\$	M	\$	Tons	\$
Nova Scotia.....	107	3,237		67,519	96	3,179		91,724
New Brunswick.....	1	64			3	142		
Quebec.....	533	15,420		45,890	540	14,191		48,952
Ontario.....	8,746	179,015		185,048	6,017	137,699		226,005
Manitoba.....	45	2,716			41	2,412		
Saskatchewan.....								
Alberta.....	22	1,249		35,793	48	2,144		47,763
British Columbia.....	603	21,128		20,208	580	20,786		21,989
Canada.....	10,057	222,829		354,458	7,325	180,553		436,433

† Includes copings, flue linings, etc.

Table 348.—Production of Pottery from Domestic Clays in Canada, 1925-1934

(For the years 1886 to 1924 see Mineral Production of Canada, 1928)

Year	Value	Year	Value
	\$		\$
1925.....	267,255	1930.....	294,866
1926.....	320,135	1931.....	257,125
1927.....	307,057	1932.....	244,861
1928.....	356,093	1933.....	202,500
1929.....	323,194	1934.....	223,733

Table 349.—Production of Kaolin and Fireclay in Canada, 1925-1934

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1925.....			623	6,544	1930.....			2,870	25,975
1926.....			2,513	23,258	1931.....			1,233	14,857
1927.....	24	120	5,070	35,961	1932.....			990	11,826
1928.....	5	25	5,123	35,284	1933.....			1,421	11,273
1929.....			5,041	35,226	1934.....	48	504	1,043	12,598

Table 350.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1925-1934

(For the years 1907 to 1924 see Mineral Production of Canada, 1928)

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1925.....	6,197	305,332	36,567	1930.....	3,789	177,608	147,309
1926.....	4,195	192,276	54,064	1931.....	2,248	107,597	83,039
1927.....	5,388	246,266	100,659	1932.....	1,580	71,757	75,209
1928.....	4,910	234,460	105,091	1933.....	1,547	73,226	80,625
1929.....	5,196	251,043	130,411	1934.....	2,109	101,219	62,388

Table 351.—Production of Refractories, in Canada, from Domestic Clays, by Provinces, 1933 and 1934

Province	1933					1934				
	Fireclay		Firebrick		Fire-clay blocks and shapes	Fireclay		Firebrick		Fire-clay blocks and shapes
	Quantity	Value	Quantity	Value	Value	Quantity	Value	Quantity	Value	Value
	Tons	\$	M	\$	\$	Tons	\$	M	\$	\$
Nova Scotia.....	22	220			75	24	230			367
New Brunswick.....	4	157			90	15	601			
Ontario.....	371	2,902	391	10,705	64,381	441	3,322	558	28,537	52,276
Saskatchewan.....			12	596		50	708	13	882	
Alberta.....										
British Columbia.....	1,024	7,994	1,144	53,015	16,079	513	7,737	1,538	71,800	9,745
Canada.....	1,421	11,273	1,547	73,226	80,625	1,043	12,598	2,109	101,219	62,388

Table 352.—Fullers' Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1930-1934

Year	Petroleum products industry		Soaps and washing compounds	
	Pounds (x)	Value	Pounds	Value
		\$		\$
1930.....	20,102,387	241,793	Data not available	
1931.....	16,157,582	201,361	492,174	6,204
1932.....	19,642,179	258,934	507,807	7,444
1933.....	22,811,655	314,515	588,434	8,501
1934.....	18,588,514	239,357	508,316	6,562

(x) Includes all clay.

Table 353.—Clay Used in the Manufacture of Paper in Canada, 1930-1934

Year	Tons	Value
		\$
1930.....	13,024	218,423
1931.....	11,484	173,660
1932.....	14,432	205,068
1933.....	20,048	267,014
1934.....	27,550	357,286

In 1933 the Canadian rubber industry consumed 1,391 tons of clays and earths valued at \$32,361 and it is interesting to note that refractories, including brick, fireclay, etc., purchased in 1934 by operators engaged in the mining, smelting and refining in Canada of non-ferrous ores were evaluated at \$816,140.

Table 354.—Imports into Canada and Exports of Clay and Clay Products, 1933 and 1934

	1933		1934	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Building brick..... ton	476	3,975	1,514	16,673
Building blocks..... xx		2,682		1,794
Clays—China..... cwt.	509,068	210,067	654,999	250,705
Fire..... cwt.	593,894	101,916	909,972	139,317
Pipe..... xx		1,222		77
Other clays, n.o.p..... xx		192,401		196,294
Zirconium silicate..... xx		687		2,029
Zirconium oxide..... xx		6,751		7,827
Drain tile, unglazed..... xx		231		251
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed..... xx		10,294		9,799
Tiles or blocks of earthenware or stone prepared for mosaic flooring..... xx		17,943		39,778
Tiles, earthenware, for roofing purposes..... xx		5,360		2,172
Tiles, earthenware, n.o.p..... xx		84,234		92,835
Insulators, electric, porcelain..... xx		55,960		62,510
Pottery and chinaware..... xx		2,858,562		3,054,124
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches for use exclusively in the construction or repair of a furnace, kiln, etc..... xx		68,725		86,039
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln, or other equipment of a manufacturing establishment..... xx		379,952		667,471
Firebrick, n.o.p..... xx		34,489		47,517
Firebrick, chrome..... xx		38,431		39,184
Magnesite brick..... xx		246,855		396,664
Silica brick (containing not less than 90 per cent silica)..... xx		147,901		210,190
Paving brick..... ton	797	4,866	1,775	12,035
Artificial teeth, not mounted..... xx		285,274		276,594
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p..... xx		114,057		115,355
Ceramic insulator cores, not further manufactured than burned and glazed, printed or decorated or not, and without fittings, when imported by manufacturers of spark plugs for use exclusively in the manufacture of spark plugs, in their own factories (from December 2, 1933)..... xx		1,539		109,915
Crucibles, clay or sand..... xx		36,703		42,142
Other manufactures of clay..... xx		50,188		56,514
Total..... xx		4,961,265		5,935,805
EXPORTS—				
Building brick..... M	383	6,789	549	10,287
Clay—Unmanufactured..... cwt.	9,769	1,522	7,619	1,668
Manufactures..... xx		11,016		14,900
Earthenware..... xx		26,965		33,762
Porcelain insulators..... xx		95,260		125,742
Total..... xx		141,552		186,359

Table 355.—World's Production of China Clay, 1932-1934

(Taken from the Imperial Institute's publication "The Mineral Industry of the British Empire and Foreign Countries, 1932-1934")

(Long tons)

Producing country and description	1932	1933	1934
BRITISH EMPIRE			
United Kingdom.....	508,850	596,609	690,129
Union of South Africa.....			369
Canada.....			43
India.....	13,486	21,935	20,562
Unfederated Malay States.....	186	36	143
Australia.....	5,110	8,477	8,786
FOREIGN COUNTRIES			
Belgium (e).....	9,566	13,651	(a)
Bulgaria.....	2,791	2,617	(a)
Czechoslovakia (estimated).....	350,000	350,000	350,000
Denmark—Crude.....	29,800	34,300	42,400
Washed and pressed.....	8,500	8,600	11,200
Dried.....	800	700	700
France.....	98,800	(a)	(a)
Germany—			
Bavaria.....	373,720	467,455	677,287
Prussia.....	8,352	11,961	61,793
Saxony—Crude.....	106,706	42,002	35,940
Washed.....	27,640	32,904	43,054
Sand.....	(a)	(a)	10,114
Italy—Crude.....	30,203	20,873	(a)
Washed and ground (c).....	8,206	4,009	(a)
Kaolinic earth.....	800	1,600	(a)
Portugal.....	6,763	9,416	11,644
Roumania (d).....	8,128	10,212	(a)
Spain (g).....	1,152	1,545	(a)
Sweden.....	1,389	1,878	(a)
Algeria.....	1,800	(a)	(a)
United States (f).....	308,030	367,172	(a)
Japan (estimated).....	400,000	400,000	400,000
Korea.....	11,821	24,536	(a)
Netherlands East Indies.....	120	229	(a)

China clay is also produced in Austria, U.S.S.R. (Russia) and China.

(a) Information not available.

(c) Derived from crude and stocks.

(d) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(e) "Eurite" and kaolin.

(f) Sales of china clay and paper clay.

(g) 3,940 cubic metres of kaolinic sand were also produced in quarries during 1932.

IMPORTED CLAY PRODUCTS

In continuance of the custom followed in previous mineral production reports, a short review of the imported-clay products industry is given herewith.

A number of factories in Canada manufacture ceramic products from clays which they import chiefly from England and the United States. Refractories, sanitary earthenware, porcelain insulators, floor and wall tile and pottery are the principal commodities made in these works. The refractories include rigid fire brick stove linings, special shapes, plastic firebrick and high-temperature cements; sanitary earthenware includes bathtubs, water closets, etc.; and pottery includes Rockinghamware such as teapots, bowls, etc., and art pottery such as lampstands, small vases and novelties. A new plant at Hamilton, Ont., started to make porcelain tableware towards the end of 1934 but no report was submitted by this company for the period in which they were in operation.

In 1934 there were 19 factories in operation in this industry as compared with 18 in 1933 and output advanced 59 per cent to \$1,923,218 from \$1,205,052 in the previous year. Capital employed was about the same at \$4,161,435 but the number of workers increased to 713 from 556 and salaries and wages rose correspondingly to \$672,754 from \$471,742. Materials for manufacturing cost \$515,465 in 1934 as against \$288,379 in 1933.

Table 356.—Products Made in the Imported-Clay Products Industry*, 1933 and 1934

Products	1933 Selling value at works	1934 Selling value at works
	\$	\$
Firebrick and stove linings—Rigid.....	220,484	266,809
Plastic.....	19,215	47,936
Porcelain insulators, sanitary ware, sewer pipe, floor and wall tile, tanks, pottery, etc.....	965,353	1,608,473
Total.....	1,205,052	1,923,218

* This industry is confined to Ontario and Quebec.

LIME

Sales of lime by Canadian producers in 1934, including both quick and hydrated, and inclusive of lime used by producers, amounted to 368,113 short tons valued at \$2,745,797 as compared with 323,540 short tons worth \$2,432,306 in 1933. The 1934 output represents an increase over 1933 of 13·8 per cent in quantity and 12·9 per cent in value. The tonnage produced in 1934 is the largest since 1930 and the pronounced increase in sales especially for building purposes reflects the increasing activities in the various spheres of construction.

The consumption of lime for chemical purposes is a factor of increasing importance in the Canadian lime industry as evidenced by a tonnage of 229,906 reported as sold or used for chemical processes in 1934, this quantity comprises 62·4 per cent of the total lime sales and includes 94,216 tons for pulp and paper mills, 26,170 tons for the cyaniding of ores in the gold mining industry, 17,140 tons for use in iron and steel mills and 92,380 tons for sugar refining, glass manufacture, etc.

Ontario and Quebec are the two most important lime producing provinces and of the total tonnage recorded for 1934 the former province contributed 191,041 or 51·9 per cent and Quebec 108,690 tons or 29·5 per cent. Quick lime at 308,122 tons and hydrated at 59,991 tons constituted 83·7 per cent and 16·3 per cent respectively of the total lime output in 1934.

Producers received in 1934 an average of \$7.26 per ton for quicklime and \$8.46 per ton for hydrated lime as compared with \$7.30 for quicklime and \$9.14 for hydrated in the preceding year.

In 1934 the Canadian lime industries employed \$8,497,895 in capital, paid \$535,492 in salaries and wages to 737 employees and consumed fuel and electricity to the value of \$606,335. The value for fuel and electricity included \$173,350 for Canadian bituminous coal, \$194,568 for imported bituminous coal and \$113,220 for wood.

"The value of hydrated lime for use as a finishing plaster depends in large measure on that property, variously called plasticity, workability or fatness which allows it to spread readily under the trowel without tearing or rolling, to give smooth uniform surface. In this respect magnesian or dolomitic hydrates are usually superior to those high in calcium although the latter, other things being equal, are superior when slaked with an excess of water and used without being dried. The possibility of improving the properties of hydrated high-calcium lime to render it as valuable as dolomitic material for plaster finishing has long been of interest to owners of small lime plants, and indeed to those of many larger ones to whom dolomitic stone is not readily available. Attempts have been made by various investigators to improve hydrated lime through the addition of chemicals to the limestone, to the quicklime or to the dry hydrate. Though certain improvements have been reported, no treatment of this kind, as far as the authors are aware, is being used commercially. It was considered that an ideal admixture would be a material which would precipitate an artificial gel around the lime particles. This suggested the possibility of using aluminium sulphate.—Qualitative trials made in the laboratory indicated that the proposal was technically feasible. It appeared, however, that an amount approaching 10 per cent of the weight of a high-calcium hydrate would be necessary in many cases to give sufficient improvement—owing, however, to the receipt of repeated inquiries by this laboratory from manufacturers interested in the improvement of their product and a considerable reduction in the market price of aluminium sulphate, the matter was re-opened, and accurate experimental results were obtained."(a)

(a) Abstract from a paper by A. F. Gill and T. H. Way of the National Research Laboratories, Ottawa.

Table 357.—Capital Employed in the Lime Industry in Canada, by Provinces, 1933 and 1934

Province	1933					1934				
	Capital employed as represented by					Capital employed as represented by				
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
New Brunswick*	174,559	17,046	8,146	32,299	232,050	159,000	13,050	8,750	25,180	205,980
Quebec.....	1,801,908	99,525	7,472	175,164	2,084,069	1,632,410	101,464	14,961	182,179	1,931,014
Ontario.....	3,351,631	88,561	8,057	57,885	3,506,134	3,150,352	102,892	4,302	62,705	3,320,251
Manitoba.....	2,193,403	56,140	40,602	11,995	2,302,140	2,170,735	44,792	44,685	3,700	2,263,212
Alberta.....	147,001	5,155	2,286	29,805	184,247	159,183	5,143	2,242	29,015	195,583
British Columbia..	442,127	33,845	26,331	109,099	611,402	377,776	33,006	28,225	142,848	581,855
Canada....	8,110,629	300,272	92,894	416,247	8,920,042	7,649,456	300,347	103,165	444,927	8,497,895

* Includes data for 2 firms in Nova Scotia.

Table 358.—Employees, Salaries and Wages in the Lime Industry in Canada, by Provinces, 1933 and 1934

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1933						
New Brunswick†.....	11	73	84	18,641	52,414	71,055
Quebec.....	19	218	237	23,629	117,944	141,573
Ontario.....	16	173	189	23,262	112,076	135,338
Manitoba.....	5	88	93	8,614	53,025	61,639
Alberta.....	3	12	15	4,350	11,624	15,974
British Columbia.....	11	67	78	7,365	47,889	55,254
Canada.....	65	631	696	85,861	394,972	480,833
1934						
New Brunswick†.....	6	69	75	11,068	52,105	63,173
Quebec.....	21	251	272	26,666	148,559	175,225
Ontario.....	17	198	215	23,379	142,918	166,297
Manitoba.....	5	63	68	8,280	51,061	59,341
Alberta.....	3	17	20	4,600	15,465	20,065
British Columbia.....	10	77	87	8,990	42,401	51,391
Canada.....	62	675	737	82,983	452,509	535,492

* See note page 26.

† Includes data for 2 firms in Nova Scotia.

Table 359.—Number of Wage-Earners on Pay Roll or Time Record on the 15th of Each Month or Nearest Representative Date, 1932-1934

Month	1932		1933		1934	
	Quarry	Kiln	Quarry	Kiln	Quarry	Kiln
January.....	193	330	202	274	247	337
February.....	199	348	185	247	259	339
March.....	230	375	239	265	252	332
April.....	254	406	218	326	259	360
May.....	283	381	305	367	337	442
June.....	259	376	337	380	337	440
July.....	292	393	361	408	311	425
August.....	281	345	350	375	279	390
September.....	265	346	339	366	311	399
October.....	246	385	323	390	330	413
November.....	223	348	238	350	263	396
December.....	196	260	273	308	233	341

Table 360.—Production of Lime in Canada, 1925-1934

(For the years 1886 to 1924 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	358,979	3,387,652	1930.....	490,802	4,038,698
1926.....	413,901	3,781,484	1931.....	344,785	2,764,415
1927.....	444,753	3,923,388	1932.....	320,650	2,394,537
1928.....	508,889	4,534,568	1933.....	323,540	2,432,306
1929.....	674,087	5,908,610	1934.....	368,113	2,745,797

Table 361.—Production of Lime in Canada, by Provinces, 1932-1934

Province	Quicklime		Hydrated lime		Total		
	Sold or used		Sold or used		Sold or used		
	Tons	Value	Tons	Value	Tons	Value	
		\$		\$		\$	
Nova Scotia.....	1932	6,075	30,954	458	4,580	6,533	35,534
	1933	3,325	24,270	589	5,890	3,914	30,160
	1934	8,298	63,630	622	4,324	8,920	67,954
New Brunswick.....	1932	5,547	59,064	6,025	50,120	11,572	109,184
	1933	8,059	68,446	8,790	66,340	16,849	134,786
	1934	8,949	76,132	6,803	50,277	15,752	126,409
Quebec.....	1932	76,983	493,787	16,830	94,114	93,813	587,901
	1933	89,740	539,603	20,594	107,955	110,334	647,558
	1934	85,106	510,614	23,584	121,370	108,690	631,984
Ontario.....	1932	143,185	1,018,007	23,518	255,223	166,703	1,273,230
	1933	126,460	1,006,906	19,733	220,291	146,193	1,227,197
	1934	168,760	1,287,251	22,281	249,038	191,041	1,536,289
Manitoba.....	1932	15,047	116,369	3,188	55,741	18,235	172,110
	1933	14,793	110,957	3,239	56,683	18,032	167,640
	1934	12,988	100,958	3,580	62,650	16,568	163,608
Alberta.....	1932	6,529	55,336	113	1,241	6,642	56,577
	1933	7,403	61,061	98	976	7,501	62,037
	1934	7,300	64,143	155	1,554	7,455	65,697
British Columbia.....	1932	14,902	141,998	2,250	18,003	17,152	160,001
	1933	18,147	144,479	2,570	18,449	20,717	162,928
	1934	16,721	135,528	2,966	18,328	19,687	153,856
Canada.....	1932	268,268	1,915,515	52,382	479,022	320,650	2,394,537
	1933	267,927	1,955,722	55,613	476,584	323,540	2,432,306
	1934	308,122	2,238,256	59,991	507,541	368,113	2,745,797

Table 362.—Production of Lime in Canada, 1933 and 1934, Showing Purposes for which Sold or Used

Purposes for which sold or used	1933				1934			
	Quicklime		Hydrated lime		Quicklime		Hydrated lime	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
Building Trades—								
Finishing lime.....	3,467	23,340	17,318	222,387	6,515	49,888	18,297	243,005
Masons' lime.....	9,667	82,565	3,697	35,838	14,223	108,575	4,985	45,553
Sand-lime brick.....	1,846	12,413	387	3,675	3,570	24,173	760	5,751
Agricultural.....	33,016	248,627	2,833	25,304	68,354	511,057	3,865	27,995
Chemical—								
Smelters.....	7,241	59,155	735	6,161	5,466	39,288	747	5,026
Iron and steel mills.....	13,170	92,703	8	79	17,132	125,706	8	72
Cyanide mills.....	20,655	147,395	28	223	24,088	174,852	2,082	12,718
Pulp and paper mills.....	68,346	431,472	24,463	134,971	71,568	439,769	22,648	119,409
Glass works.....	5,735	56,738	.....	.....	2,226	16,472	100	510
Sugar refineries.....	12,904	106,503	25	215	8,111	89,213	319	1,985
Tanneries.....	2,680	17,966	415	3,562	2,900	19,939	407	3,253
Fertilizer.....	(a)	(a)	(a)	(a)	22	154	152	1,368
Insecticide.....	(a)	(a)	(a)	(a)	725	5,075	819	6,178
Other chemical works.....	76,633	584,339	2,673	23,464	69,371	529,753	1,015	8,166
Dealers (uses unspecified).....	12,086	89,340	2,852	19,391	13,409	101,190	3,744	28,042
Other consumers.....	382	3,166	179	1,314	442	3,152	43	510
Total.....	267,927	1,955,722	55,613	476,584	308,122	2,238,256	59,991	507,541

Table 363.—Lime Sold or Used for Chemical and Other Purposes and Value of Contracts Awarded in Canada, 1930-1934

Year	Lime sold or used for chemical purposes		Lime sold or used for building or other non-chemical purposes		Value of construction contracts awarded in Canada (a)
	Tons	Value	Tons	Value	Value
		\$		\$	\$
1930.....	351,443	2,596,112	139,359	1,442,586	456,999,600
1931.....	231,837	1,637,319	112,948	1,127,096	315,482,000
1932.....	255,472	1,758,898	65,178	635,639	132,872,400
1933.....	235,810	1,664,946	87,730	767,360	97,289,800
1934.....	229,906	1,598,906	138,207	1,146,891	125,811,500

(a) Compiled by McLean Building Reports Ltd.

Table 364.—Imports into Canada and Exports of Lime and Various Lime Compounds, 1933 and 1934

	1933		1934	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Lime.....Cwt.	5,448	4,444	6,543	5,118
Calcium chloride in packages of not less than 25 pounds.....lb.	5,788,300	56,758	6,634,500	66,957
Calcium chloride in packages of less than 25 pounds.....lb.	479	158	460	107
Calcium chloride not in solution for road treating purposes.....lb.	28,095,700	319,683	44,940,900	483,623
Calcium arsenate.....lb.	287,420	17,426	165,077	9,123
Chloride of lime and hypochlorite of lime in packages of not less than 25 pounds.....lb.	4,346,500	68,681	4,585,300	75,500
Chloride of lime and hypochlorite of lime in packages of less than 25 pounds.....lb.	61,899	8,020	57,293	6,048
EXPORTS—				
Lime.....cwt.	207,786	192,029	213,491	151,983
Acetate of lime.....cwt.	8,958	20,252	30,754	53,245

SAND AND GRAVEL

Production statistics for the sand and gravel industry in Canada were first collected in 1912. Prior to that year the only data available consist of Customs' records of sand and gravel exported. In 1886 exportations amounted to 124,865 tons; twenty-four years later exports had risen to 624,824 tons appraised at \$407,974. During 1912, production was valued at \$1,512,099 and wages paid to the 875 pit employees totalled \$527,425. It was not until 1916 that tonnage statements were obtained from the operators in this industry; the total for that year amounted to 8,156,207 tons at \$1,838,320. Since 1918, the annual production has exceeded the 10-million ton mark. The highest market valuation per ton for this material was received in 1920, when 11,530,795 tons were sold for \$4,201,067. From 1927 to 1931, during a period of intensive construction, each annual output was in excess of 21,000,000 tons, there was, however, a pronounced decline to 14,469,942 tons in 1932 and 11,738,823 tons in 1933, recessions that reflected widespread restriction in building activities.

Sand and gravel production in Canada during 1934 amounted to 14,854,159 short tons valued at \$4,035,477 as compared with 11,738,823 short tons worth \$4,464,285 in 1933 and represents a 26.5 per cent increase in quantity and 9.6 per cent decrease in value.

Increases over the preceding year in the tonnage of shipments were recorded for New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta, and of the total quantity produced Quebec contributed 24.7 per cent and Ontario 53.1 per cent. Of the total shipments of sand and gravel in 1934, 686,631 tons of "sand" valued at \$209,002 were reported for building purposes, including concrete, roads, etc.; 1,454,618 tons of "sand and gravel" worth \$266,292 were utilized as railway ballast and 12,418,408 tons valued at \$3,411,751 were consumed in concrete, highway construction, etc. "Sand and gravel" used for railway ballasting in 1934 showed increases of 159 per cent in quantity and 141 per cent in value over 1933 while the same

material employed in the making of concrete and construction of roads realized a 24·7 per cent increase in tonnage but declined 12·7 per cent in value as compared with the corresponding shipments in the preceding year.

Imports of sand and gravel (n.o.p) into Canada in 1934 totalled 61,136 tons valued at \$56,900 as compared with 89,017 tons worth \$72,480 in 1933. Silica sand imported for glass and carborundum manufacture and for use in steel foundries, filtration plants, sand blasting, etc., totalled 96,165 tons appraised at \$226,188 and of these imports the United States contributed 92·7 per cent while almost the entire balance came from Belgium. Imports of siliceous or crystallized quartz, ground or unground, amounted to 2,323 tons valued at \$53,430 as against 4,370 tons at \$82,823 in 1933.

Exports of sand and gravel in 1934 totalled 88,011 tons worth \$17,079 as compared with 102,174 tons appraised at \$15,801 in the preceding year.

The annual survey of the Canadian sand and gravel industry determined 794 active shippers in 1934; excluding statistics regarding sand and gravel operations of railway companies, the fixed and current assets of operators in this industry amounted to \$4,377,551. The industry as a whole distributed \$1,236,819 in salaries and wages to 1,911 employees and consumed fuel and electricity evaluated at \$155,194.

Every province in Canada, with the exception of New Brunswick and Prince Edward Island, is producing some grade of moulding sand. For several years past the Mines Branch, Department of Mines, Ottawa, has been conducting a general investigation into "Natural Bonded Moulding Sands of Canada" with particular reference to available data concerning all known deposits. Outstanding features shown by this investigation are the large number of deposits from which supplies have been used for local foundries and the probability of replacing some imported material with Canadian sands. The Department of Mines, Ottawa, reports that Canadian producers of silica sand are steadily improving their position and each year sees an increasing use of their products, also the use of Canadian sand for sand blasting is increasing and the prospects are promising for a still further use of Canadian material for this purpose.

"Moulding sands are of two general classes—those without and those with natural bonding material, which may consist of clay or loam. The former frequently comes from glass-sand deposits and may contain 98 per cent to 99 per cent silica. Sands without natural bond being more refractory are required for steel moulding; refractory clay or other suitable bond is, however, added before use. . . . The silica minerals employed for filtration and clarification comprise ordinary sand, diatomaceous earth, and tripoli. In the filtration of water the sand acts as a support for an organic bacterial jelly which forms in the sand bed after contact with water for a week or two. This jelly causes the removal of sediment and suspended matter and reduces the bacterial count of the water. Grain size of filter sand is important, also a quite high silica content, and the specification frequently includes a maximum of acid-soluble matter and lime and magnesium carbonates. . . . The two well-known commercial varieties of vitreous silica, transparent and opaque or translucent, are of about equal chemical purity, a silica content of approximately 99·8 per cent being the usual standard. The usual raw materials for vitreous silica are quartz crystal for the transparent and high quality glass sand for the non-transparent varieties. Transparent ware is usually made to-day in electric vacuum furnaces from selected rock crystal, after crushing and washing in acid and water; present products range, in the opaque ware, from tubing measuring a fraction of a millimeter internally, to pots holding 150 gallons and pipes 2 feet or more in diameter. . . . Glass for optical purposes, tableware and plate glass, require silica sand of very high purity, 98·5 per cent to 99·8 per cent of silica with a minimum of ferric oxide and usually to somewhat rigid screen specifications; glass sand is usually produced from soft, easily crushed sandstone of high purity. The soluble glasses of which sodium silicate or waterglass is a familiar example are important; the usual process for the manufacture of sodium silicate is by the interaction of high-grade sand with soda ash; the sand specifications are similar to those applying to regular commercial glasses, a low alumina content being important in order that the resulting silicate shall be readily soluble. . . . Enamels are essentially opaque glasses, and the purity requirements for silica used in their composition are very similar to those for glass manufacture, but very finely ground silica is employed, and flint and chalcedonic quartz seem to possess advantages here. . . . The requirements for sand in sand-lime brick manufacture are not rigid, size being more important than extreme chemical purity, sufficient of the sand having to be in fine condition to form the calcium monosilicate bond; most of the sand acts simply as

the aggregate forming the body of the brick. Silica in the form of sand or crushed quartz, usually the former on account of cheapness, serves as the source of silicon in manufacturing silicon carbide for abrasive and refractory use. The sand must contain 99.0 per cent to 99.5 per cent of silica and of possible impurities, iron is particularly objectionable; a good grade of glass sand is generally used. Crushed quartzite is generally used as a source of silicon in the manufacture of ferro-silicon alloys; the requirements of quality for the quartzite are very much the same as for silica brick, but in this case the percentage of iron is unimportant . . . ; silica brick are usually made from quartzite analyzing 97 per cent to 98 per cent of silica with a small amount of lime as bond; hard, strong rock, having angular grains cemented by interstitial quartz, capable of resisting somewhat severe temperature changes without injury, and with the impurities well distributed in the interstices, is usually required." (Abstracts from a paper by W. W. Winship, as published in the "Oil, Paint and Drug Reporter").

Table 365.—Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1933 and 1934

Province	1933					1934				
	Capital employed as represented by					Capital employed as represented by				
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	400				400					
New Brunswick.....	47,457	686		1,187	49,330					
Quebec.....	249,642	3,300	800	6,703	260,445	257,134	2,900	3,180	7,056	270,270
Ontario.....	3,928,524	12,139	81,612	257,559	4,279,834	1,970,191	33,711	109,194	377,686	2,490,782
Manitoba.....	593,604	3,833	36,267	183,953	817,657	567,058	1,985	32,576	173,798	775,417
Saskatchewan.....	1,200				1,200					
Alberta.....	5,500				5,500	1,100				1,100
British Columbia.....	756,440	3,460	5,737	23,110	788,747	812,612	5,264	5,726	16,380	839,982
Canada.....	5,582,767	23,418	124,416	472,512	6,203,113	3,608,095	43,860	150,676	574,920	4,377,551

Table 366.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1933 and 1934

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1933						
Nova Scotia.....		1,003	1,003		100,784	100,784
New Brunswick.....	1	259	260	378	203,273	203,651
Quebec.....	7	851	858	12,091	430,102	442,193
Ontario.....	31	329	360	62,555	170,635	233,190
Manitoba.....	10	118	128	14,033	83,007	97,040
Saskatchewan.....		11	11		3,389	3,389
Alberta.....		41	41		35,394	35,394
British Columbia.....	12	53	65	17,704	35,734	53,438
Canada.....	61	2,665	2,726	106,761	1,062,318	1,169,079
1934						
Nova Scotia.....		170	170		101,443	101,443
New Brunswick.....		266	266		207,202	207,202
Quebec.....	12	917	929	13,685	522,606	536,291
Ontario.....	25	208	233	30,582	170,004	200,586
Manitoba.....	10	48	58	14,509	25,109	39,618
Saskatchewan.....		100	100		62,364	62,364
Alberta.....		78	78		35,564	35,564
British Columbia.....	13	64	77	16,969	36,782	53,751
Canada.....	60	1,851	1,911	75,745	1,161,074	1,236,819

* See note on page 26.

Table 367.—Number of Wage-Earners, by Months, 1932-1934

Month	1932	1933	1934
January.....	310	112	122
February.....	306	108	122
March.....	301	131	387
April.....	771	402	596
May.....	3,130	5,646	3,123
June.....	3,713	6,172	3,885
July.....	3,737	6,275	4,167
August.....	3,816	6,381	4,219
September.....	3,388	3,087	2,418
October.....	715	762	940
November.....	500	586	400
December.....	329	363	316

Table 368.—Production of Sand and Gravel in Canada, 1925-1934

(For the years 1886 to 1924 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	11,018,647	3,220,410	1930.....	28,547,511	8,344,913
1926.....	17,112,798	4,941,434	1931.....	21,748,586	6,651,165
1927.....	22,952,819	6,055,601	1932.....	14,469,942	4,480,596
1928.....	28,102,917	5,809,431	1933.....	11,738,823	4,464,285
1929.....	27,846,945	7,317,814	1934.....	14,854,159	4,035,477

Table 369.—Production in Canada, Imports and Exports of Sand and Gravel, 1932-1934

Kind	1932			1933			1934		
	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value
	Tons	Tons	\$	Tons	Tons	\$	Tons	Tons	\$
PRODUCTION—									
Sand—									
Moulding sand.....	178	8,315	5,355	3,444	4,273	9,635	1,951	11,278	13,415
Building sand and sand for concrete, roadwork, etc.....	1,930,323	437,981	745,091	347,410	428,002	218,559	360,576	326,055	209,002
Core sand.....	100	600	1,125	325	.....	325	405	3,030	2,345
Other sand (including blast and engine sands).....	2,204	41,584	13,474	216	33,177	6,086	2,072	44,012	10,046
Sand and Gravel—									
Sand and gravel for railway ballast...	23,363	2,073,861	324,648	72,338	489,200	110,449	95,566	1,359,052	266,292
Sand and gravel for concrete roads, etc.....	5,399,762	4,204,351	3,181,105	6,367,489	3,590,343	3,907,911	4,723,770	7,694,638	3,411,751
Crushed gravel.....	319,160	28,160	209,798	359,395	43,211	211,320	79,578	152,176	122,626
Total.....	7,675,090	6,794,852	4,480,596	7,150,617	4,588,206	4,464,285	5,263,918	9,590,241	4,035,477
IMPORTS—									
Sand, silica, for glass and carborandum manufacture, etc....	59,176	162,869	64,114	160,131	.....	.....	96,165	226,188	.....
Sand and gravel, n.o.p.	36,387	48,677	89,017	72,480	.....	.....	61,136	56,900	.....
Total.....	95,563	211,546	153,131	232,611	.....	.....	157,301	283,088	.....
EXPORTS.....	177,710	33,620	102,174	15,801	.....	.....	88,011	17,079	.....

NOTE.—Production includes all classes of sand and gravel other than natural silica sand or silica sand manufactured from quartz or silica rock; production of these is recorded under quartz.

Table 370.—Production of Sand and Gravel in Canada, by Railway Operators, 1932-1934

Kind	1932		1933		1934	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Sand—						
Moulding sand.....			203	300		
Building sand and sand for concrete, roads, etc.....	2,359	636	10,120	2,092	202	41
Other sand (including blast, core and engine sands).....	35,051	7,419	29,247	5,509	40,634	6,174
Sand and gravel—						
Sand and gravel for railway ballast.....	2,056,715	312,689	472,921	79,371	1,275,448	213,591
Sand and gravel for concrete, roads, etc....	103,834	23,213	215,739	35,348	296,301	49,149
Crushed gravel.....					1,755	325
Total.....	2,197,959	343,957	728,230	122,620	1,614,340	269,250

Table 371.—Production of Sand and Gravel in Canada, by Operators Other than Railways, 1932-1934

Kind	1932			1933			1934		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$	Tons	Tons	\$
Sand—									
Moulding sand.....	178	8,315	5,355	3,444	4,070	9,335	1,951	11,278	13,415
Building sand and sand for concrete, roads, etc.....	1,930,323	435,622	744,455	347,410	417,882	216,467	360,576	325,853	208,961
Core sand.....	100	600	1,125	325		325	405	3,030	2,345
Other sand (including blast, and engine sands).....	2,204	6,533	6,055	216	3,930	577	2,072	3,378	3,872
Sand and gravel—									
Sand and gravel for railway ballast.....	23,363	17,146	11,959	72,338	16,279	31,078	95,566	83,604	52,701
Sand and gravel for concrete, roads, etc.	5,399,762	4,100,517	3,157,892	6,367,489	3,374,604	3,872,563	4,723,770	7,398,337	3,362,602
Crushed gravel.....	319,160	28,160	209,798	359,395	43,211	211,320	79,578	150,421	122,301
Total.....	7,675,090	4,596,893	4,136,639	7,150,617	3,859,976	4,341,665	5,263,918	7,975,901	3,766,197

Table 372.—Production of Sand for Building and Concrete, Roads, Etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, Etc., 1930-1934

Year	SAND		SAND AND GRAVEL			
	For building, concrete, roads, etc.		For railway ballast		For concrete roads, etc.	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1930.....	3,443,185	1,399,044	6,752,420	961,462	17,409,590	5,569,202
1931.....	3,189,248	1,069,210	3,593,451	459,531	14,352,283	4,784,298
1932.....	2,368,304	745,091	2,087,224	324,648	9,604,113	3,181,105
1933.....	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751

NOTE.—For consumption of silica and silica sands see table 246, chapter 8.

Table 373.—Production of Sand and Gravel in Canada, by Provinces, 1932-1934

Kind	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1932								
Sand—								
Moulding sand.....tons	34		144	7,864	417			34
\$	78		62	4,389	620			206
Building sand and sand for concrete, roadwork, etc.....tons	191,523	12,191	699,504	1,434,751	16,968	8	3,784	9,575
\$	42,567	8,310	228,278	456,039	5,615	14	1,547	2,721
Core sand.....tons				700				
\$				1,125				
Other sand (including blast sand, engine sand, etc.).....tons		581	7,025	4,485	202	15,319	6,129	10,047
\$		155	6,144	850	42	3,120	1,365	1,798
Sand and gravel—								
Sand and gravel for railway ballast.....tons	12,881	48,148	1,131,464	363,278	28,111	345,572	89,859	77,911
\$	2,000	6,804	173,155	40,963	3,989	63,428	15,493	18,816
Sand and gravel for concrete, roads, etc.....tons	219,049	507,069	1,504,261	5,021,478	378,328	1,942	627,270	1,344,716
\$	92,032	431,910	392,602	1,383,177	174,163	380	225,117	481,724
Crushed gravel.....tons		1,161	115,730	161,891	16,283		7,025	45,230
\$		60	93,655	84,696	4,545		6,503	20,339
Total.....tons	423,487	569,150	3,458,128	6,994,447	440,309	362,841	734,067	1,487,513
\$	136,677	447,239	893,896	1,971,239	188,974	66,942	250,025	525,604
1933								
Sand—								
Moulding sand.....tons			45	7,560	91			21
\$			40	9,332	137			126
Building sand and sand for concrete, roadwork, etc.....tons		3,480	649,720	92,181	24,308	744		4,979
\$		2,626	180,172	26,625	6,437	1,378		1,321
Core sand.....tons				325				
\$				325				
Other sand (including blast sand, engine sand, etc.).....tons		729	3,332	5,197	756	12,571	3,611	7,197
\$		176	630	942	112	2,428	597	1,201
Sand and gravel—								
Sand and gravel for railway ballast.....tons	31,441	50,661	60,696	279,637	16,123	76,425	15,753	30,802
\$	5,633	10,238	12,684	59,748	2,702	11,213	2,248	5,983
Sand and gravel for concrete, roads, etc.....tons	250,787	442,091	2,378,290	5,456,486	243,901	14,660	261,758	909,859
\$	120,398	318,457	622,766	2,340,730	97,665	4,712	82,732	320,451
Crushed gravel.....tons			264,149	126,608	3,035			8,814
\$			126,137	79,528	1,775			3,880
Total.....tons	232,228	496,961	3,356,232	5,967,994	288,214	104,400	281,122	961,672
\$	126,031	331,497	942,429	2,517,230	108,828	19,731	85,577	332,962
1934								
Sand—								
Moulding sand.....tons				12,908	321			
\$				12,998	417			
Building sand and sand for concrete, roadwork, etc.....tons	1,350		510,205	145,703	20,294	2,768	1,222	5,089
\$	200		144,060	56,386	6,335	205	480	1,336
Core sand.....tons			252	1,306				
\$			126	1,524	695			
Other sand (including blast sand, engine sand, etc.).....tons		520	8,471	4,813		20,979	6,450	4,851
\$		167	4,729	710		2,377	1,195	868
Sand and gravel—								
Sand and gravel for railway ballast.....tons	41,726	141,304	230,989	651,516	98,791	166,149	34,259	89,884
\$	7,726	22,603	45,916	130,624	16,101	19,861	5,402	18,059
Sand and gravel for concrete, roads, etc.....tons	213,496	426,240	2,750,006	7,046,018	181,727	343,679	608,301	848,941
\$	106,671	299,468	692,500	1,610,934	55,898	146,590	189,821	309,869
Crushed gravel.....tons			172,659	18,695	31,016			9,384
\$			93,123	8,513	15,980			5,010
Total.....tons	256,572	568,064	3,672,582	7,880,959	334,026	533,575	650,232	958,149
\$	114,597	322,238	980,454	1,821,689	95,426	169,033	186,898	335,142

SAND-LIME BRICK

On account of its association with other building materials data regarding the production of sand-lime brick are included in this report. Statistics relating to sand-lime brick are not included in the totals for structural materials industries as both the sand and lime used have been so recorded; production of sand-lime brick is regarded as a manufacturing operation and therefore is shown in the report on the *Manufactures of the Non-Metallic Minerals*, issued annually by the Bureau.

Only 6 factories in Canada manufactured sand-lime brick during 1934; 4 of these were located in Ontario and 2 were in Quebec. These works, representing a capital of \$781,444, employed an average of 78 workers throughout the year and paid out \$65,996 for salaries and wages and \$51,316 for raw materials.

Production of sand-lime building brick was reported at 12,744 M valued at \$135,588 a gain of 49 per cent in quantity and 48 per cent in value from the 1933 output which, however, was the lowest on record for the industry. Some sand-lime hollow building blocks, cinder blocks, and ready-mixed concrete were also made by the concerns in this group bringing the total output value to \$174,069 in 1934 as compared with \$116,367 in 1933 and \$153,716 in 1932.

Building operations in Canada showed some improvement in 1934 over the preceding year but were still very much below the normal level of pre-depression years. Likewise, the production of sand-lime building bricks was much below the average of earlier years. In 1920 production amounted to 39,264 M at \$693,641; in 1925 to 68,869 M at \$854,055; in 1928 to 82,271 M at \$1,038,510; in 1930 to 52,770 M at \$567,022, and in 1931 to 46,003 M at \$469,783.

Table 374.—Production of Sand-Lime Brick in Canada, 1930-1934

Year	Ontario		Other provinces		Canada	
	Quantity	Selling value at works	Quantity	Selling value at works	Quantity	Selling value at works
	M	\$	M	\$	M	\$
1930.....	41,576	424,178	11,194	142,844	52,770	567,022
1931.....	34,400	313,189	11,603	156,594	46,003	469,783
1932.....	6,523	78,398	3,996	53,042	10,819	131,440
1933.....	6,922	69,784	1,619	21,684	8,541	91,468
1934.....	10,585	107,528	2,159	28,060	12,744	135,588

SLATE

Slate deposits located along the south shore of the St. Lawrence river in Quebec, were operated for the first time in 1854. Production from these deposits reached a maximum in point of value in 1889 when 6,935 tons valued at \$119,160 were shipped. These shipments consisted of roofing slates, mantels and slabs. Quarrying operations were carried on at the Quebec deposits up to 1923, in which year 1,836 tons of crushed green and red slate were shipped for use in the manufacture of roofing material.

No slate was produced in Canada from 1923 to 1929, each year since 1930 there has been a production of the material and in 1934 shipments of slate were made from quarries located at Ste. Hénédine, Dorchester county, Quebec; Madoc, Hastings county, Ontario and Sooke Lake, British Columbia.

Table 375.—Production of Slate in Canada, 1923-1934

Year	Tons	Value	Year	Tons	Value
		\$			\$
1923.....	1,836	17,289	1932.....	250	3,750
1924-1929.....			1933.....	250	3,750
1930.....	150	3,000	1934.....	738	4,802
1931.....	250	5,000			

NOTE.—For years 1886 to 1922 see previous reports. For imports and exports of slate see table 387.

THE STONE INDUSTRY IN CANADA

Including (1) the Stone Quarrying Industry and (2) the Monumental and Ornamental Stone Industry

The stone industry in Canada comprises two main divisions: (1) The Stone Quarrying Industry, including quarries and dressing works operated in conjunction with quarries, and (2) The Monumental and Ornamental Stone Industry, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the monumental and ornamental stone industry are included under manufacturing. For convenience this report carries data for both of these industries.

The two industries are treated separately in the following review.

(1) PRIMARY PRODUCTION—The Stone Quarrying Industry

Statistics of the stone industry as set forth in the general tables of this report have been confined to quarrying operations and to the production of dressed stone when this operation is carried on in conjunction with the quarrying. The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are widely distributed throughout Canada. The products from quarries operating in these formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their growing requirements.

Shipments of limestone, granite, sandstone and marble from Canadian quarries during 1934 amounted to 4,077,016 short tons valued at \$4,152,329 as compared with an outout of 2,939,574 short tons worth \$2,996,576 in 1933. The 1934 sales represent increases of 38.7 per cent in tonnage and 38.6 per cent in value over those of the preceding year. Production in 1934 comprised 3,747,779 tons of limestone, 200,285 tons of granite, 115,169 tons of sandstone, and 13,783 tons of marble. In addition to this production 738 tons of slate were produced, 806,546 tons of limestone used in cement manufacture and approximately 600,000 tons of limestone consumed in the Canadian lime industry.

Increases in value of sales over 1933 were recorded for each variety of stone produced and all tonnages shipped were greater with the exception of granite. The improvement in the stone industry as a whole during 1934 was realized in Eastern Canada and more particularly in Ontario where, compared with 1933, increases of 96.2 per cent in quantity and 56.8 per cent in value of sales were attained. The almost general uptrend in construction and industrial activities was reflected in the pronounced increase in shipments of stone for building purposes, chemical processes, highway construction, railroad ballasting and cement manufacture.

Capital employed in 1934 by the Canadian primary stone industry totalled \$12,983,836; the industry provided employment for 2,087 persons, distributed \$1,499,272 in salaries and wages, and consumed fuel and electricity amounting in value to \$311,516.

The combined value of all varieties of stone imported during 1934 totalled \$797,963 as compared with \$94,180 in 1933; the value of stone exports was also greater, increasing from \$94,180 in 1933 to \$109,916 in 1934.

"As a result of research conducted in the laboratories of the Mines Branch, Department of Mines, Ottawa, which proved that certain large deposits of argillaceous dolomite in the Niagara Peninsula were of suitable composition for the manufacture of rock wool, an industry to manufacture this commodity has been established in Canada. In September, 1934, Spun Rock Wools Ltd., Thorold, Ontario, began production of a long-fibred rock wool made by a method entirely different from that used in any other rock wool or slag wool plant. Two other Canadian companies expect to commence production of rock wool during 1935. In the agricultural limestone field a trend toward the use of pulverized dolomite in place of high-calcium limestone is noted.

This is due to the wider realization that magnesia as well as lime is required for the best growth of many crops and has resulted in the opening up of several small dolomite quarries. Limestones of great variety of chemical composition and physical characteristics are available in Canada and are being extensively quarried for the numerous uses to which limestone is put. . . . The principal quarries from which limestone for building purposes is obtained are in the following localities: St. Marc des Carrières, Quebec (grey limestone); Montreal (grey limestone); Queenston, Ontario (silver grey, buff and variegated grey and buff); Longford, Ontario (buff); Tyndall, Manitoba, (mottled grey, mottled buff and mottled variegated). Quarries producing small quantities of building stone for local use are situated near Quebec city and at Hull, in Quebec; and at Ottawa and Kingston in Ontario. Waste material is utilized for crushed stone, rubble, riprap, flagging, chemical and metallurgical use and for lime manufacture. . . . The principal centre of marble production in Canada is at Philipsburg, Quebec, where clouded grey marbles, some of which are lined and tinted with green and pink, are quarried; black marble is also produced here. A limestone quarried at St. Marc des Carrières, Quebec, takes a good polish and yields a dark brownish grey marble. In Ontario, black marble is quarried at St. Albert; at Longford two varieties of very fine-grained faintly mottled, buff marble and also a mottled brown marble are produced; at Bancroft a number of varieties of handsome marble are available, the most striking of which is clouded grey breccia in which the bond is of a rich chocolate colour. In Manitoba, mottled gold-and-buff and mottled purplish red marbles are available in a quarry at Fisher Branch, 100 miles north of Winnipeg and rose-coloured and mottled red marbles occur in quarries north of The Pas. In British Columbia, white and bluish grey marble is produced 8 miles north of Kootenay Lake. . . .

"A large proportion of the granite produced in Canada is used for foundations for highways, for permanent ballasting of railway road beds, and for heavy aggregate in large concrete structures. . . . The province of Quebec furnishes the largest proportion of granite for building purposes, the Stanstead, Scotstown and St. Sebastien districts being the biggest producers of this class of stone. Granite for monumental purposes is produced in the Maritime Provinces as well as in Quebec, Ontario, Manitoba and British Columbia." (Abstracts from a report issued by the Department of Mines, Ottawa).

Canadian sandstone has been utilized extensively in the construction of many important public buildings in the Dominion; the rock occurs in Canada in a variety of colours including white, reddish brown, purple (bands), yellow and grey; shipment of sandstone were made in 1934 from quarries located in Nova Scotia, New Brunswick, Quebec and Ontario.

Table 376.—Capital Employed in the Stone Quarrying Industry in Canada, by Provinces, 1933 and 1934

Province	1933					1934				
	Capital employed as represented by					Capital employed as represented by				
	Present value of land buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total	Present value of land buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.	691,637	23,803	7,919	3,758	727,117	650,486	20,394	11,500	3,473	685,853
New Brunswick.	155,535	15,851	10,353	24,364	206,103	142,855	10,342	7,015	34,991	195,203
Quebec.	4,413,874	328,572	184,390	847,555	5,774,391	4,313,765	365,464	121,019	708,635	5,508,883
Ontario.	6,789,665	226,124	264,099	323,005	7,602,893	4,756,566	142,507	138,128	399,547	5,436,748
Manitoba.	541,470	39,111		54,562	635,143	457,198	40,399		49,644	547,241
Alberta.	12,000			800	12,800					
British Columbia.	542,901	34,721	17,664	204,465	799,751	533,479	34,740	15,041	26,648	609,908
Canada.	13,147,082	668,182	484,425	1,458,509	15,758,198	10,854,349	613,846	292,703	1,222,938	12,983,836

Table 377.—Employees, Salaries and Wages in the Stone Industry in Canada, by Provinces, 1933 and 1934

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1933						
Nova Scotia.....	7	68	75	7,460	43,841	51,301
New Brunswick.....	9	75	84	8,612	45,056	53,668
Quebec.....	81	1,060	1,141	99,944	524,634	624,578
Ontario.....	72	346	418	132,307	216,889	349,196
Manitoba.....	19	64	83	42,733	28,388	71,121
Alberta.....	.....	3	3	.....	3,392	3,392
British Columbia.....	11	70	81	20,513	77,007	97,520
Canada.....	199	1,686	1,885	311,569	939,207	1,250,776
1934						
Nova Scotia.....	4	84	88	6,560	61,956	68,516
New Brunswick.....	9	92	101	9,298	71,311	80,609
Quebec.....	103	1,068	1,171	108,443	615,166	723,609
Ontario.....	75	540	615	138,089	363,576	501,665
Manitoba.....	14	20	34	37,325	15,352	52,677
Alberta.....	.....	.....	.....	.....	.....	.....
British Columbia.....	12	66	78	17,370	54,826	72,196
Canada.....	217	1,870	2,087	317,085	1,182,187	1,499,272

* See note page 26.

Table 378.—Number of Wage-Earners in Primary Stone Industries, by Months, 1932-1934

Month	1932	1933	1934	Month	1932	1933	1934
January.....	1,605	689	671	July.....	3,011	2,319	3,172
February.....	1,640	839	676	August.....	3,087	2,245	2,951
March.....	1,702	899	845	September.....	2,852	2,374	2,703
April.....	1,907	1,157	1,169	October.....	2,608	2,358	2,366
May.....	2,564	1,823	2,065	November.....	1,918	1,853	1,874
June.....	2,901	2,175	2,893	December.....	1,237	1,249	1,115

Table 379.—Production of Granite* in Canada, 1925-1934

(For the years 1886 to 1924 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	971,718	2,014,535	1930.....	1,851,132	3,379,951
1926.....	1,064,423	1,574,627	1931.....	1,190,887	2,763,050
1927.....	730,049	1,383,557	1932.....	490,822	1,110,582
1928.....	1,195,810	2,366,946	1933.....	256,723	679,585
1929.....	1,728,165	3,080,815	1934.....	200,285	781,739

* Includes all igneous rock.

Table 380.—Production of Limestone and Sandstone in Canada, 1925-1934

(For the years 1886 to 1924 see Mineral Production of Canada, 1928)

Year	Limestone		Sandstone		Year	Limestone		Sandstone	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1925.....	4,643,853	5,049,563	87,502	145,757	1930.....	7,732,675	8,075,616	384,610	769,060
1926.....	5,283,745	5,657,328	44,127	112,347	1931.....	6,262,430	6,305,538	924,101	1,332,833
1927.....	6,438,379	7,145,917	132,799	232,793	1932.....	3,687,241	3,227,715	500,483	349,458
1928.....	6,949,420	7,267,437	100,951	223,236	1933.....	2,572,911	2,142,516	99,043	108,562
1929.....	7,720,840	8,172,681	159,407	398,974	1934.....	3,747,779	3,157,832	115,169	143,283

Table 381.—Production of Marble in Canada, 1925-1934

(For the years 1886 to 1924 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1925.....	3,046	254,922	1930.....	26,089	809,582
1926.....	5,295	521,572	1931.....	20,442	668,713
1927.....	5,209	503,037	1932.....	12,379	250,706
1928.....	7,753	414,682	1933.....	10,897	65,913
1929.....	14,012	414,062	1934.....	13,783	69,475

Table 382.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1933 and 1934

Province	Granite	Limestone*	Marble	Sandstone	Total
1933					
Nova Scotia.....	tons 8,145	21,514		11,790	41,449
	\$ 36,675	43,911		16,043	96,629
New Brunswick.....	tons 1,792	14,262		660	16,714
	\$ 82,771	41,994		6,695	131,370
Quebec.....	tons 131,837	1,129,248	7,983	73,425	1,342,493
	\$ 408,207	940,019	42,283	58,231	1,448,740
Ontario.....	tons 19,650	1,222,752	2,614	8,890	1,253,906
	\$ 39,433	910,419	21,083	12,333	983,268
Manitoba.....	tons 332	32,858			33,190
	\$ 2,987	71,240			74,227
Alberta.....	tons 1,472			73	1,550
	\$ 4,317			4,500	5,817
British Columbia.....	tons 94,967	150,805	300	4,200	250,272
	\$ 109,512	130,706	2,547	10,760	253,525
Canada.....	tons 256,723	2,572,911	10,897	99,043	2,939,574
	\$ 679,585	2,142,516	65,913	108,562	2,996,576
1934					
Nova Scotia.....	tons 325	105,620		17,123	123,068
	\$ 12,300	135,962		23,055	171,317
New Brunswick.....	tons 5,984	30,356		1,578	37,918
	\$ 76,793	78,441		5,948	161,182
Quebec.....	tons 69,428	1,034,058	9,302	86,364	1,199,152
	\$ 482,477	953,815	47,503	85,822	1,575,617
Ontario.....	tons 75,526	2,370,339	4,331	10,104	2,460,300
	\$ 128,386	1,788,107	20,556	28,458	1,965,507
Manitoba.....	tons 213	42,914			43,127
	\$ 2,702	50,843			53,545
Alberta.....	tons 2,737				2,737
	\$ 8,104				8,104
British Columbia.....	tons 48,809	161,755	150		210,714
	\$ 73,081	142,560	1,416		217,057
Canada.....	tons 200,285	3,747,779	13,783	115,169	4,077,016
	\$ 781,739	3,157,832	69,475	143,283	4,152,329

NOTE.—In addition to the above production there was produced 250 tons of slate valued at \$3,750 in 1933 and 738 tons at \$4,802 in 1934; also not included in the limestone statistics are 616,364 tons of limestone consumed in the cement industry in 1933 and 806,546 tons in 1934. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 600,000 tons of limestone was burned in the manufacture of lime in 1934.

*Production of limestone in Quebec includes marl used as fertilizer.

Table 383.—Production* of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1933

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough.....tons		167	14,975	13,205	461		730	29,538
\$		723	34,127	28,073	1,319		4,380	68,622
Dressed.....tons		140	7,848	1,223	1,272	78	200	10,761
\$		5,600	206,911	6,541	39,678	4,500	9,000	272,230
Monumental and ornamental—								
Rough.....tons	230	367	3,038	324			352	4,311
\$	3,100	18,742	25,794	11,764			3,597	62,997
Dressed.....tons	415	449	1,647	13			685	3,209
\$	21,075	58,865	113,988	404			24,187	218,519
Flagstone.....tons		19	24	823				866
\$		675	61	1,685				2,421
Curbstone.....tons		202	1,027	30				1,259
\$		2,363	4,099	9				6,471
Paving blocks.....tons		161	1,370	80			30	1,641
\$		1,840	8,736	500			200	11,276
Lining open-hearth furnaces.....tons					240			240
\$					450			450
Chemical—								
Flux in iron and steel plants.....tons			887	19,456	725			21,068
\$			1,180	11,674	1,106			13,969
Flux in smelters.....tons				46,792			27,314	74,106
\$				36,496			22,402	58,898
Glass factories.....tons			50			771		821
\$			375			1,157		1,532
Pulp and paper mills.....tons	4,584	3,892	56,780	32,427	9,259		25,228	132,170
\$	7,451	5,051	46,843	28,686	9,469		35,010	132,510
Sugar refineries.....tons				14,636	9,421			24,057
\$				10,980	10,833			21,813
Other chemical uses.....tons	35		25	63,005				63,065
\$	542		162	68,235				68,939
Whiting.....tons								
\$								
Asphalt filler.....tons	178		24,469	133				24,780
\$	808		70,362	914				72,084
Dusting coal mines.....tons						487		487
\$						1,948		1,948
Agricultural purposes.....tons	6,717	10,350	47,894	13,385			293	78,639
\$	19,510	36,649	43,172	9,323			1,426	110,080
Poultry grit.....tons		20	62	1,208	486	214	174	2,164
\$		204	465	5,183	709	1,212	1,260	9,033
Stucco dash.....tons			966	2,346			61	3,373
\$			5,632	14,463			428	20,523
Terrazzo flooring.....tons			238					238
\$			1,675					1,675
Rubble and riprap.....tons	85	350	82,685	4,454	1,295		85,847	174,716
\$	127	140	61,749	2,186	944		71,373	136,519
(Concrete aggregate.....tons			717,586	263,864			10	981,460
\$			477,420	204,768			25	682,213
Crushed stone: Road metal.....tons	29,205		352,053	729,671	10,031		92,021	1,212,981
\$	44,016		326,297	526,562	9,719		62,910	969,504
Railroad ballast.....tons		597	28,869	46,831			17,327	83,624
\$		518	19,692	14,822			17,327	52,559
Total.....tons	41,449	16,714	1,342,493	1,253,906	33,190	1,550	250,272	2,939,574
\$	96,629	131,376	1,448,740	983,268	74,227	8,817	253,525	2,996,576
Per cent of total.....Quantity	1.41	0.57	45.67	42.66	1.13	0.05	8.51	100.00
Value	3.22	4.38	48.35	32.81	2.48	0.30	8.46	100.00

NOTE.—See footnote to table 382.

* Sales or shipments from quarries.

Table 384.—Production* of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1934

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough..... tons	8	14	12,867	14,522	460		733	28,604
\$	70	164	32,863	56,386	1,306		3,696	94,485
Dressed..... tons		920	21,975	1,014	150		2	24,061
\$		5,500	376,606	6,774	6,430		300	395,610
Monumental and ornamental—								
Rough..... tons	175	312	3,477	269	213		213	4,659
\$	2,300	5,017	25,921	5,553	2,702		2,482	43,975
Dressed..... tons	150	473	3,326	6			745	4,700
\$	10,000	62,317	171,682	176			28,216	272,391
Flagstone..... tons			47	547			20	614
\$			47	3,745			16	3,808
Curbstone..... tons		68	276				1	345
\$		578	1,066				1	1,645
Paving blocks..... tons		125	4,931	72			32	5,160
\$		1,000	42,411	405			199	44,015
Lining open-hearth furnaces..... tons					602			602
\$					1,129			1,129
Chemical—								
Flux in iron and steel plants..... tons			3,488	86,352	1,789			91,629
\$			9,507	52,026	2,866			64,399
Flux in smelters..... tons			625	112,496		366	32,246	145,733
\$			563	84,909		549	26,595	112,616
Glass factories..... tons			1,450			1,021		2,471
\$			9,419			1,531		10,950
Pulp and paper mills..... tons	4,615	3,807	74,670	29,809	10,575		26,521	149,997
\$	8,507	5,502	61,057	26,181	10,649		32,466	144,362
Sugar refineries..... tons		50		12,626	6,623			19,299
\$		185		9,470	7,620			17,275
Other chemical uses..... tons			2,810	76,770	371		500	80,451
\$			2,067	93,167	575		2,018	97,827
Whiting..... tons								
\$								
Asphalt filler..... tons	237	318	19,005	1,076				20,636
\$	948	1,273	36,867	4,861				43,949
Dusting coal mines..... tons						658		658
\$						2,632		2,632
Agricultural purposes..... tons	2,958	19,348	38,383	20,702			173	81,564
\$	8,367	60,958	59,282	12,827			692	142,126
Rock wool..... tons				229				229
\$				321				321
Roofing..... tons				4,582				4,582
\$				36,345				36,345
Poultry grit..... tons	12	120	1,090	368	692		100	2,382
\$	120	780	4,646	552	3,392		654	10,144
Stucco dash..... tons			1,213	1,754			28	2,995
\$			7,323	6,729			306	14,358
Terrazzo flooring..... tons			74	608	170			852
\$			501	2,432	379			3,312
Rubble and riprap..... tons	216	1,171	122,060	12,177	2,678		37,103	175,405
\$	399	568	66,018	7,575	2,330		31,302	108,192
Concrete aggregate..... tons			420,719	400,380				821,099
\$			311,960	296,280				608,240
Crushed stone { Road metal..... tons	114,709	11,300	411,270	1,413,113	19,128		92,967	2,062,487
\$	140,726	18,000	328,126	1,096,284	17,007		68,784	1,668,927
Railroad ballast..... tons			56,366	270,106			19,330	345,802
\$			31,551	158,415			19,330	209,296
Total..... tons	123,068	37,918	1,199,152	2,460,300	43,127	2,737	210,714	4,077,016
\$	171,317	161,182	1,575,617	1,965,507	53,545	8,104	217,057	4,152,329
Per cent of total..... Quantity	3.0	0.9	29.4	60.4	1.1	0.0	5.2	100.00
Value	4.1	4.0	37.9	47.3	1.3	0.2	5.2	100.00

NOTE.—See footnote to table 382.

* Sales or shipments from quarries.

Table 385.—*Production of Stone in Canada, by Kinds, Showing Purposes for Which Used, 1933 and 1934

Kind	Granite		Limestone		Marble		Sandstone	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
Building—								
Rough.....1933	1,749	6,994	20,987	49,548	35	2,083	6,767	9,997
1934	4,752	16,228	14,493	50,682	1,000	4,000	8,359	23,575
Dressed.....1933	4,140	114,318	5,638	111,235	165	27,377	818	19,300
1934	10,105	216,574	13,036	173,536			920	5,500
Monumental and ornamental—								
Rough.....1933	3,758	49,469			553	13,528		
1934	4,325	37,464	47	349	287	6,162		
Dressed.....1933	3,090	215,616	118	2,868			1	35
1934	4,212	244,286	123	3,438	358	24,342	7	275
Flagstone.....1933	70	35	24	61			772	2,325
1934	20	16	82	67			512	3,725
Curbstone.....1933	1,224	6,437	35	34				
1934	345	1,645						
Paving blocks.....1933	1,641	11,276						
1934	5,160	44,015						
Lining open-hearth furnaces.....1933			240	450				
1934			602	1,129				
Chemical—								
Flux in iron and steel plants.....1933			21,068	13,960				
1934			91,629	64,399				
Flux in smelters.....1933			74,106	58,898				
1934			145,733	112,616				
Glass factories.....1933			771	1,157	50	375		
1934			1,021	1,531	1,450	9,419		
Pulp and paper mills.....1933			128,852	129,856	3,318	2,654		
1934			146,767	141,989	3,230	2,373		
Sugar refineries.....1933			24,057	21,813				
1934			19,299	17,275				
Other chemical uses.....1933			63,065	68,939				
1934			77,641	95,760	2,810	2,067		
Whiting.....1933								
1934								
Asphalt filler.....1933	92	736	24,638	71,348				
1934	171	1,368	20,465	42,581				
Dusting coal mines.....1933			487	1,948				
1934			658	2,632				
Agricultural purposes.....1933			78,639	110,080				
1934			51,564	142,126				
Rock wool.....1933								
1934			229	321				
Roofing.....1933	1,193	9,544						
1934	4,457	35,656	125	689				
Poultry grit.....1933	3	60	891	3,325	1,270	5,648		
1934	6	90	1,289	5,304	1,037	4,750		
Stucco dash.....1933			61	428	2,119	10,551		
1934			146	943	2,849	13,415		
Terrazzo flooring.....1933					238	1,675		
1934			170	379	682	2,933		
Rubble and riprap.....1933	103,584	89,651	30,848	15,535	3,149	2,022	37,135	29,311
1934	38,212	32,261	105,578	56,876	30	14	31,585	19,041
Crushed stone—								
Concrete aggregate.....1933	19,259	21,962	961,854	659,975			347	276
1934	22,680	23,278	789,856	574,271			8,563	10,691
Road metal.....1933	116,323	152,969	1,043,455	769,217			53,203	47,318
1934	105,840	128,858	1,897,307	1,466,943			59,340	73,126
Railroad ballast.....1933	597	518	93,027	51,841				
1934			339,919	201,946			5,883	7,350
Total.....1933	256,723	679,585	2,572,911	2,142,516	10,897	65,913	99,043	108,562
 1934	200,285	781,739	3,747,779	3,157,832	13,783	69,475	115,169	143,283

* For production of slate see Table 375 also footnote to Table 382.

Table 386.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railroad Ballast, 1930-1934

		Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture
1930.....	tons	173,204	586,456	2,115,104	3,910,245	2,036,981	2,925,399
	\$	4,184,778	540,534	1,623,904	3,434,935	1,674,298	.....
1931.....	tons	129,345	333,699	3,275,276	3,122,633	652,352	2,489,147
	\$	3,717,993	314,088	2,565,204	2,557,515	485,447	.....
1932.....	tons	62,951	226,966	1,929,756	1,847,371	89,835	1,141,376
	\$	1,035,571	188,829	1,320,088	1,474,870	84,930	.....
1933.....	tons	40,299	315,287	981,460	1,212,981	93,624	616,364
	\$	340,852	297,652	682,213	969,504	52,359	.....
1934.....	tons	52,665	489,580	821,099	2,062,487	345,802	806,546
	\$	490,095	447,429	608,240	1,668,927	209,296	.....

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry.

Table 387.—Imports into Canada and Exports of Stone, by Kinds, 1933 and 1934

	1933		1934	
	Tons	Value \$	Tons	Value \$
IMPORTS—				
Curling stones and handles.....	115	3,075	113	2,645
Building stone, other than marble or granite, sawn on more than two sides, but not sawn on more than four sides.....	4	200	.....	.....
Building stone, other than marble or granite, planed, turned, cut, or further manufactured than sawn on four sides.....	.....	.....	1	122
Flagstone, sandstone, and all building stone, not hammered, sawn or chiselled.....	.....	8,947	3,155	16,879
Flagstone and building stone, other than marble or granite, sawn on not more than two sides.....	.....	729	305	2,748
Granite, rough, not hammered or chiselled.....	.....	48,928	.....	65,925
Granite, sawn only.....	.....	5,366	.....	4,961
Granite, monuments.....	.....	28,916	.....	19,036
Granite, manufactures, of, n.o.p.....	.....	8,495	.....	8,212
Marble, rough, not hammered or chiselled.....	.....	7,063	.....	3,144
Marble, sawn or sand rubbed, not polished.....	.....	10,474	.....	11,322
Marble, not further manufactured than sawn for tombstones.....	.....	16,695	.....	15,078
Marble, manufactures of, n.o.p.....	.....	18,526	.....	8,440
Paving blocks of stone.....	.....	25	.....	.....
Refuse stone, not sawn, hammered or chiselled.....	41,277	35,773	364,088	200,398
Slate roofing.....	.....	7,064	.....	12,476
Slate pencils.....	.....	722	.....	465
Slates, writing.....	.....	17,816	.....	18,354
Slate mantels and manufactures of slate, n.o.p.....	.....	4,965	.....	9,671
Chalk, china, Cornwall or cliff stone and mica schist.....	.....	17,283	.....	21,371
Mineral wool.....	1,115	38,262	1,494	69,267
Whiting, gilders' whiting and Paris white.....	9,903	91,744	12,034	119,643
Manufactures of stone, n.o.p.....	.....	15,531	.....	22,126
Lithographic stones not engraved.....	.....	1,366	.....	211
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....	.....	18,113	.....	25,142
Grindstones, not mounted, and not less than 36 inches in diameter.....	No.	76,615	1,024	140,327
Total.....		482,693		797,963
EXPORTS—				
Crushed stone.....	40,343	76,162	52,273	94,794
Granite and marble, unwrought.....	964	12,997	1,153	9,766
Freestone, limestone, and other building stone, unwrought.....	173	1,480	.....	.....
Dressed stone of all kinds.....	.....	701	.....	409
Grindstones, manufactured.....	.....	2,840	.....	4,947
Total.....		94,180		109,916

2. SECONDARY PRODUCTION—Monumental and Ornamental Stone Industry

In 1934 there were 218 stone dressing works in Canada which were not operated in conjunction with the producers' own quarries. These works were engaged chiefly in cutting and polishing rough stone purchased from Canadian quarries or imported from foreign countries to produce finished monuments or dressed stone for building purposes. Production from these works

amounted in value to \$2,407,474 in 1934 as compared with \$2,162,650 in 1933 and \$2,961,914 in 1932. Output from the 111 establishments in Ontario totalled \$1,329,398 or 55 per cent of the total for Canada, and production from the 50 works in Quebec amounted to \$552,298 or 23 per cent of the total.

The average number of employees in the 218 works in this group was 881 in 1934 as compared with 821 in 1933 and payments in salaries and wages advanced to \$886,809 from \$841,425.

The cost of rough stone and other materials used in 1934 was \$834,323 as against \$691,523 in 1933.

Capital employed was reported at \$5,194,702 in 1934, including \$2,912,024 as the value of land, buildings, machinery and other equipment, \$1,274,603 as the value of inventories of raw materials, finished products and stocks in process, and \$1,008,075 as the total of operating capital. In 1933 the corresponding total was \$5,461,171.

Output of building stone has been much below normal during the past three years because of continued inactivity in the building trades. In 1934 the total output of dressed building stone, including that produced in both the primary and secondary plants was valued at \$849,748 as compared with \$666,973 in 1933, \$1,949,199 in 1932, \$6,819,615 in 1931, \$8,527,501 in 1930, and \$6,956,583 in 1929.

The total value of dressed stone for monumental and ornamental purposes was \$1,738,362 in 1934, \$1,560,521 in 1933, \$1,586,861 in 1932, \$2,143,030 in 1931, \$2,600,019 in 1930, and \$2,687,818 in 1929.

Table 388.—Production from the Monumental and Ornamental Stone Industry, by Provinces, 1933 and 1934

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monu-ments	For building pur-poses	Monu-ments	For building pur-poses		Monu-ments and bases	For building pur-poses			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island										
1933	6,740		9,067					3,804	275	19,886
1934	9,410		9,895					4,560	212	23,987
Nova Scotia—										
1933	71,447		14,380			900		15,763	2,227	104,717
1934	64,102		13,741			1,679		25,330	2,554	107,406
New Brunswick—										
1933	42,791		1,900					3,565	443	48,699
1934	40,656		2,679			315		2,428	177	46,255
Quebec—										
1933	251,597	2,867	26,047	24,435	450	3,730	64,063	23,119	38,373	434,631
1934	327,867	17,865	21,652	35,812	672	1,110	106,119	25,243	15,958	552,298
Ontario—										
1933	592,140	26,472	88,179	26,660	1,000	13,052	215,495	240,507	25,811	1,229,316
1934	663,325	5,672	61,470	80,752		13,027	164,964	303,070	37,118	1,329,398
Manitoba—										
1933	51,691		14,073	11,300	100	6,537		31,411	2,593	117,705
1934	54,353	150	12,027	7,226	50	3,569	5,194	26,700	2,018	111,287
Saskatchewan—										
1933	27,824	810	18,290		1,087	4,371	1,516	6,237	4,553	64,688
1934	25,943	810	21,671		1,688	4,811	4,002	10,129	3,160	72,214
Alberta—										
1933	38,099	10,000	22,285	5,000	75	1,780		7,725	315	85,189
1934	48,091	11,000	17,612	5,650	40	2,525		9,360	1,040	95,318
British Columbia—										
1933	29,115	75	6,092	6,050				14,233	2,204	57,769
1934	37,262	460	7,544	8,462				13,902	1,681	69,311
Canada—										
1933	1,111,354	40,224	200,313	73,445	2,712	30,370	281,074	346,364	76,794	2,162,650
1934	1,271,009	35,957	168,201	137,902	2,450	27,036	280,279	420,722	63,918	2,407,474

APPENDIX ONE

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1934.

Arsenic.—White arsenic (As_2O_3) shipped from Canadian smelters at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining, at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the net amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made by British Columbia, Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20.671834 per fine ounce until the end of 1930. For succeeding years unless otherwise specified gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price for the refined metal in Canadian funds.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co. Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co. Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London in Canadian funds.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements of quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of

a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

DIRECTORY

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given and the location of the properties worked in 1934 is also shown.

METAL MINING INDUSTRIES

Alluvial Gold Mining Industry*

Name	Head office address	Location
QUEBEC—		
Cook and Lloyd.....	St. Simon les Mines.....	Gilbert River.
Gold River Mining Co. Ltd.....	956 New Birks Bldg., Montreal.....	Compton Co.
Unit Co. Ltd.....	62 St. Peter St., Quebec.....	Beauce Co.
ALBERTA—		
McLeod River Mining Corp., Ltd.....	200 Bay St., Toronto, Ont.....	McLeod River.
BRITISH COLUMBIA—		
Alberta Pacific Cons. Oils, Ltd.....	302 Toronto General Trusts Bldg., Calgary, Alberta.....	Lillooet Mining Div.
Barkerville Gold Mines, Ltd.....	708-525 Seymour St., Vancouver.....	Barkerville.
Barrington, S.C.....	Wrangell, Alaska.....	Stikine.
Black Watch Mines, Ltd.....	Nelson.....	Nelson Mining Div.
Boundary Creek Mining Co.....	814 Metropolitan Bldg., Vancouver.....	Greenwood Mining Div.
Bride, Maurice.....	Atlin.....	Atlin Mining Div.
Brown, H. P.....	Hixon.....	Barkerville.
Buchanan & Cumming.....	Atlin.....	Atlin Mining Div.
Bullion Placers, Ltd.....	501 Vancouver Block, Vancouver.....	Quesnel Mining Div.
Butterworth & MacKay Bros.....	1056 Foul Bay Rd., Victoria.....	Leech River.
Cariboo Northern Development Co., Ltd.....	704 Bank of Toronto Bldg., Victoria.....	Omineca Mining Div.
Cedar Creek Hydraulic Mines, Ltd.....	323 Sayward Bldg., Victoria.....	Quesnel Mining Div.
Clay, J. R.....	Spruce Creek, Atlin.....	Atlin Mining Div.
Colpe, Chas. H.....	Atlin.....	Atlin Mining Div.
Columbia Development, Ltd.....	410 King St., Kitchener, Ont.....	Atlin Mining Div.
Compagnie Française des Mines d'Or du Canada.....	19 rue d'Aurnale, Paris, France.....	Atlin Mining Div.
Consolidated Gold Alluvials of B.C., Ltd.....	1040 West Georgia St., Vancouver.....	Lightning Creek.
Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Atlin Mining Div., Fort Steel Mining Div., Omineca Mining Div.
De Mers Placer, Ltd.....	660 St. Catherine St. W., Montreal, P.Q.....	Wigwam.
Dredgement Syndicate.....	Tlell.....	Shuttle Island.
Eastman Red Gulch Placers, Ltd.....	Barkerville.....	Cariboo Mining Div.
Eldorado Placers, Ltd.....	1044 Beach Ave., Vancouver.....	Cariboo Mining Div.
Elieff, McDonald & McKay.....	Atlin.....	Spruce Creek.
Falconer, D. H.....	Atlin.....	Atlin Mining Div.
French Creek Hydraulic Placers, Ltd.....	410 Lancaster Bldg., Calgary, Alberta.....	Cariboo Mining Div.
Gold Run Exploration Co., Ltd.....	509 Union Bldg., Victoria.....	Atlin Mining Div.
Golden Strand Syndicate (N. H. Terry).....	Masset.....	Graham Island.
Guyet Placers, Ltd.....	1012 Royal Bank Bldg., Vancouver.....	Barkerville.
High Run Placer Gold Mines, Ltd.....	319 West Pender St., Vancouver.....	Jessica.
Hodges & Moron.....	Atlin.....	Atlin.
Jacobson, Roy.....	Trout Lake.....	Lardeau Creek.
Johnson, Nelson & Ueland.....	Atlin.....	Spruce Creek.
Ketch Hydraulic Co.....	Van Winkle.....	Devil's Canyon.
Lower Bridge River Placers, Ltd.....	708 Yorkshire Bldg., Vancouver.....	Lillooet Mining Div.
Lowhee Mining Co., Ltd.....	1109 Rust Bldg., Tacoma, Wash., U.S.A.....	Cariboo.
Lykegard, Carl E.....	Atlin.....	Spruce Creek.
Matson & Schultz.....	Atlin.....	Ruby Creek.
Morse, McKechnie & Brett.....	Atlin.....	Spruce Creek.
McKinnon, Chas. E.....	Atlin.....	Spruce Creek.
Mew, Edmund.....	914 East 15th Ave., Vancouver.....	Clinton Mining Div.
Moose Syndicate.....	Likely.....	Quesnel Mining Div.
Morrison, McKay & Johnson.....	Atlin.....	Ruby Creek.
Murphy, Nathan.....	Atlin.....	O'Donnell River.
Parret, François.....	Quesnel.....	Finlay River.
Pine Creek Mining Co., Ltd.....	837 West Hastings St., Vancouver.....	Quesnel Mining Div.
Placer Engineers, Ltd.....	304-535 Georgia St. W., Vancouver.....	Quesnel Mining Div.
Queen City Mining Co.....	501-1411 4th Avenue Bldg., Seattle, Wash., U.S.A.....	Cariboo Mining Div.
Ruby Gold Mines, Ltd.....	470 Granville St., Vancouver.....	Quesnel Mining Div.
Sang Dang Placer.....	Barkerville.....	Cariboo Dist.
Silta & Hagberg.....	Finnmoore.....	
Skoldquist & Co.....	Atlin.....	Spruce Creek.
Slade-Cariboo Gold Placers, Ltd.....	1410 Hoge Bldg., Seattle, Wash., U.S.A.....	Barkerville.
Sombrio Placer Mining Syndicate.....	507 Stock Exchange Bldg., Vancouver.....	Victoria Mining Div.
Sovereign Creek Gold Mines, Ltd.....	612 Standard Bank Bldg., Vancouver.....	Quesnel Mining Div.
Sundberg, Carl.....	Wingdam.....	Barkerville.
Trehouse Hydraulic Mining Co.....	Barkerville.....	Cariboo Mining Div.
Turnquist, Emil.....	Atlin.....	Ruby Creek.
Tyughton Creek Gold Placers, Ltd.....	118 Vancouver Block, Vancouver.....	Lillooet Mining Div.
Walton, Lindal & Williams.....	Atlin.....	Spruce Creek.
Yates & Boe.....	Hudson Hope.....	Hudson Hope.
Yeager, A. C.....	Lumberton.....	Fort Steele Mining Div.
Zahara, A. J.....	Ryeroft, Alberta.....	Hudson Hope.

(*) In addition to the operators listed there were numerous active properties for which official returns were not received.

DIRECTORY OF FIRMS—Continued
Alluvial Gold Mining Industry—Concluded

Name	Head office address	Location
YUKON—		
Holbrook Dredging Co.....	Glacier.....	60 Mile Creek.
Inca Mining Corp., Ltd.....	Carcross.....	Iron Creek.
McDonald, McCormick & Stewart.....	Glacier Creek.....	Glacier Creek.
Ostby, T.....	1070 Haro St., Vancouver, B.C.....	Hunker Creek.
Yukon Consolidated Gold Corp., Ltd.....	140 Wellington St., Ottawa, Ont.....	Dawson.

Auriferous Quartz Mining Industry

NOVA SCOTIA—		
*Associated Gold Mines of Nova Scotia, Ltd..	908 Transportation Bldg., Montreal, P.Q.....	Lawrencetown, Central Rawdon.
Banook Gold Mines, Ltd.....	1310 Concourse Bldg., Toronto, Ont.....	Molega.
Beacon Gold Mines, Ltd.....	706/100 Adelaide St. W., Toronto, Ont.....	Mill Village.
*Bluenose Gold Syndicate.....	321 Federal Bldg., Toronto, Ont.....	Goldboro.
Consolidated Mining & Smelting Company of Canada, Ltd.....	840 Dominion Square Bldg., Montreal, P.Q.....	Caribou Gold Mines.
Corwin Gold Mines, Ltd.....	Enfield.....	Oldham.
Guysboro Mines, Ltd.....	1220/25 King St. W., Toronto, Ont.....	Goldenville.
Higgins & Lawlor.....	Moose River Gold Mines.....	Moose River Dist.
Hogan, F. J.....	Mt. Uniacke.....	Mt. Uniacke.
*Kemptville Gold Mining Co.....	Box 219, Yarmouth.....	Kemptville.
Lacey Gold Mining Co., Ltd.....	35 Bedford Row, Halifax.....	Chester Basin.
*Minerals, Limited.....	Roy Bldg., Halifax.....	Various mines.
Montague Gold Mines, Ltd.....	706/100 Adelaide St. W., Toronto, Ont.....	Dartmouth.
*Queens Mines, Ltd.....	297 Agricola St., Halifax.....	Mt. Uniacke.
Seal Harbour Gold Mines, Ltd.....	57 Bloor St. W., Toronto, Ont.....	Goldboro.
Stuart, S. J.....	Isaac's Harbour.....	Guysboro Co.
*Thompson, J. H.....	Box 98, Oxford.....	Moosehead.
United Goldfields of Nova Scotia, Ltd.....	Liverpool.....	Brookfield Mines.
QUEBEC—		
*Adanac Gold Mines, Ltd.....	601/330 Bay St., Toronto, Ont.....	Rouyn.
*Amity Gold Mines, Ltd.....	1302 Canada Permanent Bldg., Toronto, Ont.....	Bourlamaque Tp.
*Arcadian Rouyn Gold Mines Syndicate, Ltd.....	Commonwealth Bldg., King St. E. Toronto, Ont.....	Rouyn.
*Arno Mines, Ltd.....	63 Sparks St., Ottawa, Ont.....	Rouyn.
*Arntfield Gold Mines, Ltd.....	303 Old Birks Bldg., Montreal.....	Arntfield.
*Avalon Mining Syndicate, Ltd.....	67 Yonge St., Toronto, Ont.....	Vauquelin.
*Basin Gold Mines, Ltd.....	619/159 Craig St. W., Montreal.....	Varsan Tp.
Beattie Gold Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Duparquet Tp.
*Beaufor Gold Mines, Ltd.....	1208 Edifice Aldred, Montreal.....	Pascalis Tp.
Bidlamaque Gold Mines, Ltd.....	320 Bay St., Toronto, Ont.....	Bourlamaque Tp.
*Birrell Gold Mines, Ltd.....	300 Sterling Tower, Toronto, Ont.....	Duprat Tp.
*Blake River Gold Mines, Ltd.....	317/132 St. James St. W., Montreal.....	Cadillac Tp.
*Blouin Lake Gold Mines, Ltd.....	136 Sparks St., Ottawa, Ont.....	Bourlamaque Tp.
*Bourbeau Lake Chibougamau Mines, Ltd.....	New Liskeard, Ontario.....	Chibougamau.
*Brownlee Mines, Ltd.....	Box 456, Noranda.....	Noranda.
Bussières Mining Co., Ltd.....	221 Notre Dame St. W., Montreal.....	Louvicourt Tp.
*Calder Bousquet Gold Mines, Ltd.....	706/100 Adelaide St. W., Toronto, Ont.....	Bousquet Tp.
*Canadian Malartic Gold Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Fourniere Tp.
*Canadian Pandora Gold Mines, Ltd.....	Box 790, New Liskeard, Ont.....	Cadillac Tp.
*Central Malartic Mines, Ltd.....	350 Bay St., Toronto, Ont.....	Malartic Tp.
*Chibougamau-Tibblemont Syndicate.....	810 Federal Bldg., 85 Richmond St. W., Toronto, Ont.....	Tibblemont Tp.
*Coniagas Reduction Co., Ltd.....	320 Bay St., Toronto, Ont.....	Gillet Tp.
*Consolidated Chibougamau Goldfields, Ltd.....	276 St. James St. W., Montreal.....	Chibougamau.
*Consolidated Mining & Smelting Company of Canada, Ltd.....	840 Dominion Square Bldg., Montreal.....	
*Contact Gold Mines, Ltd.....	320 Bay St., Toronto, Ont.....	Bourlamaque Tp.
*Cummings-Trudel Mining & Develop. Co., Ltd.....	201 Victoria Bldg., Ottawa, Ont.....	Barraute Tp.
*Del Rio Mining Co., Ltd.....	506/56 Sparks St., Ottawa, Ont.....	Destor Tp.
*Dorrington Mining Syndicate.....	2408 Stanley St., Niagara Falls, Ont.....	Boischatel Tp.
*Dorval-Siscoe Gold Mines, Ltd.....	357 Bay St., Toronto, Ont.....	Varsan Tp.
*Dubuison Mines, Ltd.....	25 King St. W., Toronto, Ont.....	N. W. Quebec.
*Duparquet Mining Co., Ltd.....	204 Hospital St., Montreal.....	Duparquet Tp.
*East Lamaque Gold Mines, Ltd.....	357 Bay St., Toronto, Ont.....	Bourlamaque Tp.
*East Malartic Mines, Ltd.....	913 Royal Bank Bldg., Montreal.....	Fourniere Tp.
*Engineers Exploration Co., Ltd.....	Box 310, Noranda.....	
*Erie Canadian Mines, Ltd.....	Box Ex, Kirkland Lake, Ont.....	N. W. Quebec.
*Explorer Syndicate.....	c/o W. M. Goodwin, Ste. Anne de Bellevue.....	Rouyn Tp.
*Farrell Rouyn Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Rouyn Tp.
*Fleming Mines, Ltd.....	2150 St. Jacques St., Montreal.....	Pascalis Tp.
*Fleming-Thompson Gold Mines, Ltd.....	Box 308, Rouyn.....	Duparquet Tp.
*Francœur Gold Mines, Ltd.....	941 Dominion Square Bldg., Montreal.....	Boischatel Tp.
*Galatea Gold Mines, Ltd.....	1335 Star Bldg., Toronto, Ont.....	Duparquet Tp., Destor Tp.
*Gilbee Mines, Ltd.....	200 Bay St., Toronto, Ont.....	Pascalis Tp.
*Glenwood Mining Co., Ltd.....	Rouyn.....	Rouyn Tp.
*Gold Bar Mines, Ltd.....	204 Royal Bank Bldg., Toronto, Ont.....	Rouyn.
*Golden Quebec Mines, Ltd.....	Sterling Tower, Toronto, Ont.....	Bousquet Tp.
*Granada Gold Mines, Ltd.....	204 Royal Bank Bldg., Toronto, Ont.....	Rouyn Tp.
*Green Stabell Mines, Ltd.....	1406 Concourse Bldg., Toronto, Ont.....	Dubuison Tp.

DIRECTORY OF FIRMS—Continued

Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
QUEBEC—Concluded		
*Halliwell Gold Mines, Ltd.	132 St. Jacques W., Montreal	Boischatel Tp.
*Harricana Amalgamated Gold Mines, Ltd.	105 Mountain Hill, Quebec	Abitibi Co.
*Herbin Lake Gold Syndicate, Ltd.	357 Bay St., Toronto, Ont.	Bourlamaque Tp.
*Joannes Mine Corporation.	276 St. James St., Montreal	Joannes Tp.
*Jupiter Gold Syndicate.	601/330 Bay St., Toronto, Ont.	Rouyn Tp.
*Keyroc Gold Mining Co., Ltd.	244 Bay St., Toronto, Ont.	Rouyn Tp.
*Kindall Mines, Ltd.	217 University Tower, Montreal	Rouyn Tp.
*Kinghorn Sturgeon Mines, Ltd.	357 Bay St., Toronto, Ont.	Bourlamaque Tp.
*Kirkland Crest Gold Mining Syndicate.	811 Ottawa Electric Bldg., Ottawa, Ont.	Louvicourt Tp.
*Lake Expanse Mines, Ltd.	701/407 McGill St., Montreal	Guillett Tp.
*Lake Fortune Gold Mines, Ltd.	941 Dominion Square Bldg., Montreal	Boischatel Tp.
La Mine d'Or Venus Cons.	51 Rue Colomb, Quebec	Barraute Tp.
*Leader Gold Mines, Ltd.	405 Concourse Bldg., 100 Adelaide St. W., Toronto, Ont.	Tiblenmont Tp.
*Lamaque Gold Mines, Ltd.	Bourlamaque via Amos	Bourlamaque Tp.
*Louvre Gold Mines, Ltd.	701/407 McGill St., Montreal	Louvicourt Tp.
*Manley Quebec Gold Mines, Ltd.	703/357 Bay St., Toronto, Ont.	LaKeine Tp.
*McDonald Gold Mines, Ltd.	Elmira, Ont.	Duparquet Tp.
*McIntyre Porcupine Mines, Ltd.	Schumacher, Ont.	Guillett Tp.
*McWatters Gold Mines, Ltd.	Box 689, Rouyn	Rouyn Tp.
*Maritime Cadillac Syndicate.	Moncton, N.B.	Cadillac Tp.
*Murwood Gold Mines, Ltd.	405 Concourse Bldg., Toronto, Ont.	Tiblenmont Tp.
*Met-Maz Prospectors, Ltd.	701/407 McGill St., Montreal	Louvicourt Tp.
*Midland Mining Corp., Ltd.	231 Notre Dame St. W., Montreal	Desmeloizes Tp.
*Mines Development Corp.	189 St. Jean St., Quebec	N. W. Quebec
*Monarch Mines, Ltd.	14 King St. E., Toronto, Ont.	Dasserat Tp.
*Mooshla Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*Newroy Gold Mines, Ltd.	465 Bay St., Toronto, Ont.	Louvicourt Tp.
*Norlake Mining Corp.	Castle Bldg., Montreal	Rouyn
*Normont Gold Mines, Ltd.	905 Transportation Bldg., Montreal	Rouyn Tp.
*Northern Aerial Canada Golds, Ltd.	Concourse Bldg., Toronto, Ont.	N. W. Quebec
*Northern Chibougamau Mines, Ltd.	460 St. Francois Xavier St., Montreal	Chibougamau
*Northern Quebec Gold Fields & Exploration Co.	Three Rivers	Bousquet Tp.
*Northern Quebec Gold Mines, Ltd.	341 Dominion Square Bldg., Montreal	Rouyn
*Nu Brien Gold Syndicate, Ltd.	320 Bay St., Toronto, Ont.	Bourlamaque Tp.
*O'Brien Gold Mines, Ltd.	Kewagama	Cadillac Tp.
*O'Leary Malarie Mines, Ltd.	Box 123, Noranda	N. W. Quebec
*O'Neill-Thompson Mining Syndicate.	c/o E. B. Eddy Co., Hull	Joannes Tp.
*Pan Canadian Gold Mines, Ltd.	24 Milk St., Boston, Mass.	Cadillac Tp.
*Payore Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Bourlamaque Tp.
*Perron Gold Mines, Ltd.	Pascal	Pascal Tp.
*Pontiac Rouyn, Ltd.	708/130 Adelaide St. W., Toronto, Ont.	Noranda
*Powell Rouyn Gold Mines, Ltd.	440 Confederation Life Bldg., Toronto, Ont.	Rouyn Tp.
*Prospectors Airways, Ltd.	80 King St. W., Toronto, Ont.	Rose Lake
*Quebec Eureka Gold Mines, Ltd.	11 King St. W., Toronto, Ont.	Tiblenmont Tp.
*Quebec Gold Belt Mines, Ltd.	Box 190, Fort Erie, Ont.	Bourlamaque Tp.
*Quebec Viking Gold Mines, Ltd.	305/330 Bay St., Toronto, Ont.	Boischatel Tp.
*Raymond Tiblenmont Syndicate.	205 Brock Bldg., Toronto, Ont.	Tiblenmont Tp.
*Roodor Gold Mines, Ltd.	Usher Bldg., Toronto, Ont.	Bourlamaque Tp.
*Rouyn Reward Gold Mines, Ltd.	305/330 Bay St., Toronto, Ont.	Joannes and Rouyn Tps.
*Seguin Rouyn Gold Mines, Ltd.	1007 Place d'Armes, Montreal	Rouyn
*Senneterre Gold Syndicate.	1007/465 Bay St., Toronto, Ont.	Senneterre
*Shawkey Gold Mining Co., Ltd.	67 Yonge St., Toronto, Ont.	Dubuisson Tp.
*Sigma Mines, Ltd.	Valdor	Bourlamaque Tp.
*Siseco Gold Mines, Ltd.	907 Dominion Square Bldg., Montreal	Dubuisson Tp.
*Sladen Malarie Mines, Ltd.	63 Sparks St., Ottawa, Ont.	N. W. Quebec
*South Tiblenmont Mines, Ltd.	1007/465 Bay St., Toronto, Ont.	Tiblenmont Tp.
*Stadacona Rouyn Mines, Ltd.	159 Craig St. W., Montreal	Rouyn
*Stanley Siseco Extension Gold Mines, Ltd.	231 St. James St. W., Montreal	Varsan Tp.
*Sudbury Contact Mines, Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*Sudbury Mines, Ltd.	11 Jordan St., Toronto, Ont.	Joannes Tp.
*Sullivan Consolidated Mines, Ltd.	1207 Aldred Bldg., Montreal	Dubuisson Tp.
*Tavernier Gold Mining Syndicate.	11 King St. W., Toronto, Ont.	Tavernier Tp.
*Tiblenmont Contact Mining Syndicate.	34 King St. E., Toronto, Ont.	Tiblenmont Tp.
*Tiblenmont Extension Syndicate.	811 Federal Bldg., Toronto, Ont.	Tiblenmont Tp.
*Tiblenmont Island Mining Co., Ltd.	Senneterre	Tiblenmont Tp.
*United Gold Exploration, Ltd.	276 St. James St. W., Montreal	Laverlochere Tp.
*Vicour Gold Mines, Ltd.	80 King St. W., Toronto, Ont.	Louvicourt Tp.
*West Shore Gold Mines, Ltd.	816 Keefer Bldg., Montreal	Abitibi Co.
*Wiltsey-Coglan Mines, Ltd.	25 King St. W., Toronto, Ont.	Rouyn Tp.
ONTARIO—		
*Algoid Mines, Ltd.	45 Richmond St. W., Toronto	Goudreau Dist.
*Algoma Summit Gold Mines, Ltd.	514 McKinnon Bldg., Toronto	Goudreau Dist.
*Aischbach Gold Mining Co., Ltd.	New Liskeard, Ont.	Grenfell Tp.
*Amalgamated Gold Fields Corp., Ltd.	1104 Northern Ontario Bldg., Toronto	Baity Tp.
*Anglo-Huronian, Ltd.	80 King St. W., Toronto	Timmins
*Ardeen Gold Mines, Ltd.	132 St. James St. W., Montreal, Que.	Kashabowie
*Ashley Gold Mining Corp., Ltd.	602/350 Bay St., Toronto	Bannockburn Tp.
*Bankfield Gold Mines, Ltd.	1006 Concourse Bldg., Toronto	Errington Tp.
*Barry-Hollinger Mines, Ltd.	57 Bloor St. W., Toronto	Boston Creek
*Beatty-Waterloo Mines, Ltd.	16 Cedar St. E., Waterloo	Beatty Tp.
*Bey Mines, Ltd.	1601 Sterling Tower, Toronto	Eastern Ontario
*Biggood Kirkland Gold Mines, Ltd.	32 Main St., Hamilton	Kirkland Lake
*Bilmae Gold Mines, Ltd.	364 Bay St., Toronto	Shining Tree

DIRECTORY OF FIRMS—Continued

Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
ONTARIO—Continued.		
*Bob Tough Gold Mines, Ltd.	21 Main St. E., Hamilton.	McKinnon Tp.
Buffalo Ankerite Gold Mines, Ltd.	Box 1728, Buffalo, N.Y.	South Porcupine.
*Canadian Reserve Mines, Ltd.	306 C.P.R. Bldg., Toronto.	Larder Lake.
*Canusa Gold Mines, Ltd.	416 Penobscot Bldg., Detroit, Mich., U.S.A.	Porcupine Area.
Casey-Summit Gold Mines, Ltd.	465 Bay St., Toronto.	Summit Lake.
*Centennial Gold Mines, Ltd.	Box 212, Blind River.	Michipicoten.
Central Canada Mines, Ltd.	232 Grain Exchange, Winnipeg, Man.	Sapawe.
Central Patricia Gold Mines, Ltd.	1001 Federal Bldg., Toronto.	Patricia Dist.
Clark Gold Mines, Ltd.	388 St. James St., Montreal, Que.	Dymont.
*Coulson Consolidated Gold Mines, Ltd.	1104 Northern Ontario Bldg., Toronto.	Matheson.
*Concordia Gold Mining Co., Ltd.	276 St. James St. W., Montreal, Que.	Porcupine Dist.
Coniaurum Mines, Ltd.	25 King St. W., Toronto.	Schumacher.
*Consolidated Mining & Smelting Company of Canada, Ltd.	840 Dominion Square Bldg., Montreal, Que.	Cordova Mines.
*Craig Gold Mines, Ltd.	Box 179, Madoc.	Hastings Co.
*Darwin Gold Mines, Ltd.	703/357 Bay St., Toronto.	Wawa.
*Delnite Mines, Ltd.	Box EX, Kirkland Lake, Ont.	Timmins.
*De Santis Gold Mining Co.	24½ Second Ave., Timmins.	Ogden Tp.
Dikdik Exploration Co., Ltd.	941 Dominion Square Bldg., Montreal, Que.	Kinghorn.
Dome Mines, Ltd.	36 Toronto St., Toronto.	South Porcupine.
*Dumond Mining & Exploration Co., Ltd.	Haileybury.	Jellicoe.
Duport Mining Co., Ltd.	Utilities Bldg., Port Arthur.	Shoal Lake.
*Erie Canadian Mines, Ltd.	Box EX, Kirkland Lake.	Kirkland Lake.
*Excello Mines, Ltd.	159 Bay St., Toronto.	South Porcupine.
*Federated Mining Corp., Ltd.	11 King St. W., Toronto.	Tisdale Tp.
Foley Syndicate.	57 Bloor St., Toronto.	Mine Centre.
*Four Nations Consolidated Gold Mines, Ltd.	372 Bay St., Toronto.	Kenogami Lake.
*Fox Lake Gold Mines, Inc.	511 Liberty Bank Bldg., Buffalo, N.Y.	Michipicoten.
*Gillies Lake Porcupine Gold Mines, Ltd.	18 Toronto St., Toronto.	Timmins.
*Glenora Gold Mines, Ltd.	1005 Federal Bldg., Toronto.	Kirkland Lake.
*Golden Gate Mining Co., Ltd.	59 Yonge St. Toronto.	Swaстика.
*G Iden Sumr. it Mines, Ltd.	2374 Bloor St. W., Toronto.	Sesekinika.
*Gold Range Mines, Ltd.	1604 Royal Bank Bldg., Toronto.	Schreiber.
*Halcrow Swayze Mines, Ltd.	1821 Canadian Bank of Commerce Bldg., Toronto.	Halcrow Tp.
*Hard Rock Gold Mines, Ltd.	603 Royal Bank Bldg., Toronto.	Little Long Lac.
*Harwood Lake Mines, Ltd.	21 King St. E., Toronto.	Sudbury Dist.
*Hislop Gold Mines, Ltd.	503/357 Bay St., Toronto.	Hislop Tp.
Hollinger Consolidated Gold Mines, Ltd.	Timmins.	Timmins and Hislop Tp.
*Horseshoe Mines, Ltd.	302 Royal Bank Bldg., Toronto.	Kenora Dist.
Howey Gold Mines, Ltd.	717 Federal Bldg., Toronto.	Red Lake.
*Hudson Patricia Gold Mines, Ltd.	112 Yonge St., Toronto.	Narrow Lake.
*Interlac Gold, Ltd.	112 Dalhousie St., Brantford.	Long Lac Dist.
*Iroquois-Kirkland Mines Corp., Ltd.	537 Ellicott Sq., Buffalo, N.Y., U.S.A.	Kirkland Lake.
J-M Consolidated Gold Mines, Ltd.	1116 Federal Bldg., Toronto.	Patricia Dist.
*Kenora Prospectors & Miners, Ltd.	Box 591, Kenora.	Shoal Lake.
*Kirkland Gold Belt Mines, Ltd.	156 Yonge St., Toronto.	Kirkland Lake.
Kirkland Lake Gold Mining Co., Ltd.	930 Canadian Bank of Commerce Bldg., Toronto.	Kirkland Lake.
*Koch Daneff Gold Mines, Ltd.	1104 Bank of Hamilton Bldg., Toronto.	Jellicoe.
*Lafayette Long Lac Gold Mines, Ltd.	200 Bay St., Toronto.	Long Lac Dist.
*Lake Caswell Mines, Ltd.	1465 Yonge St., Toronto.	Shining Tree Dist.
*Lakeland Gold, Ltd.	19 Sun Life Bldg., Hamilton.	Maisonville Tp.
*Lake Shore Mines, Ltd.	Kirkland Lake.	Kirkland Lake.
*Langmuir Longlac Gold Mines, Ltd.	1005 Federal Bldg., Toronto.	Little Long Lac Area.
Lebel Oro Mines, Ltd.	703 Northern Ontario Bldg., Toronto.	Long Lake.
*Lee Gold Mines, Ltd.	244 Bay St., Toronto.	Greenlaw Tp.
Little Long Lac Gold Mines, Ltd.	1331 Canadian Bank of Commerce Bldg., Toronto.	Geraldton.
*Longlac Lagoon Gold Mines, Ltd.	1005 Federal Bldg., Toronto.	Little Long Lac Area.
*Lucky Kirkland Gold Mines, Ltd.	215/159 Bay St., Toronto.	Eby Tp.
*McCuaig Red Lake Gold Mines, Ltd.	347 Bay St., Toronto.	Red Lake.
*McFarlane Long Lac Gold Mines, Ltd.	1112/85 Richmond St. W., Toronto.	Long Lac Dist.
McIntyre Porcupine Mines, Ltd.	Box 12, Schumacher.	Tisdale Tp.
*Macjoe Sturgeon Gold Mines, Ltd.	67 Yonge St., Toronto.	Thunder Bay Dist.
*McKenzie Red Lake Gold Mines, Ltd.	507 National Bldg., Bay St., Toronto.	Red Lake.
*McLaren-Porcupine Gold Mines, Ltd.	Box 507, South Porcupine.	Deloro Tp.
*MacLeod-Cockshutt Gold Mines, Ltd.	1001 Federal Bldg., Toronto.	Geraldton.
McMillan Gold Mines, Ltd.	Sudbury.	Mongowin Tp.
Macassa Mines, Ltd.	85 Richmond St. W., Toronto.	Kirkland Lake.
*May-Spiers Gold Mines, Ltd.	919/159 Bay St., Toronto.	Red Lake.
*Magnet Lake Gold Mines, Ltd.	1005 Federal Bldg., Toronto.	Little Long Lac Area.
*Makwa Champagne Gold Mines, Ltd.	502 McKinnon Bldg., Toronto.	Champagne Tp.
*Manitoba & Eastern Mines, Ltd.	1821 Canadian Bank of Commerce Bldg., Toronto.	Strathy Tp.
Marbuan Gold Mines, Ltd.	1730 Rand Bldg., Buffalo, N.Y., U.S.A.	South Porcupine.
*Margo Mines, Ltd.	1302 Canadian Permanent Bldg., Toronto.	Matatchewan Dist.
Matatchewan Consolidated Mines, Ltd.	2810/25 King St. W., Toronto.	Matatchewan Dist.
Minto Gold Mines, Ltd.	Wawa.	Wawa.
Moffat Hall Mines, Ltd.	Haileybury.	Lebel Tp.
*Murray Algoma Mining Co., Ltd.	1105/45 Richmond St. W., Toronto.	Algoma Dist.
Munro Croesus Gold Mines, Ltd.	Haileybury.	Munro Tp.
*Naybob Gold Mines, Ltd.	808/85 Richmond St. W., Toronto.	Porcupine Dist.
*Northern Empire Mines Co., Ltd.	Empire.	Beardmore.
*Northern Securities Co.	39 Bank of Toronto Bldg., London.	Boston Creek and Mongowin Tp.

DIRECTORY OF FIRMS—Continued

Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
ONTARIO—Concluded.		
Northern Turnbull Gold Mines, Ltd.	372 Bay St., Toronto.	Turnbull Tp.
Parkhill Gold Mines, Ltd.	1835 Beaver Hall Bldg., Montreal, Que.	Wawa.
Paymaster Consolidated Mines, Ltd.	South Porcupine.	South Porcupine.
Pamour Porcupine Mines, Ltd.	221 Notre Dame St. W., Montreal, Que.	Whitney Tp.
Pickle Crow Gold Mines, Ltd.	1406 Concourse Bldg., Toronto.	Patricia Dist.
Plaunik Mining Syndicate.	6 Norton Ave., Toronto.	Goward.
Plymouth Gold Mining Co., Ltd.	276 St. James St. W., Montreal, Que.	Rainy River Dist.
Porcupine Peninsular Gold Mines, Ltd.	80 King St. W., Toronto.	Connaught.
Rahill Red Lake Mining Co., Ltd.	67 Yonge St., Toronto.	Red Lake.
Richelieu Gold Mines, Ltd.	701/330 Bay St., Toronto.	Savant Lake.
Rich Rock Gold Mines, Ltd.	901 Star Bldg., Toronto.	Lennox and Addington.
Rickard Raymore Gold Mines, Ltd.	601 Concourse Bldg., Toronto.	Rickard Tp.
St. Anthony Gold Mines, Ltd.	159 Bay St., Toronto.	Sturgeon Lake.
Saundary Syndicate.	Mine Centre.	Rainy River Dist.
Scott Gold Mining Syndicate.	1405/302 Bay St., Toronto.	Red Lake.
S. B. Smith Mine.	Wawa.	Wawa.
Sol d'Or Gold Mine, Ltd.	Narrow Lake.	Narrow Lake.
Sooeana Mining Co., Ltd.	450 Queen St. E., Sault Ste. Marie.	Algoma Dist.
South McKenzie Island Mines, Ltd.	1112/85 Richmond St. W., Toronto.	Red Lake.
Swayze Huxley Gold Mines, Ltd.	910 Sterling Tower, Toronto.	Cunningham Tp.
Sylvanite Gold Mines, Ltd.	Box EX, Kirkland Lake.	Kirkland Lake.
Tache Gold Syndicate, Ltd.	Brandon, Man.	Dymont.
Talisman Gold Mines, Ltd.	364 Bay St., Toronto.	Guibord Tp.
Tashota Goldfields, Ltd.	706/100 Adelaide St. W., Toronto.	Tashota.
Tack-Hughes Gold Mines, Ltd.	Kirkland Lake.	Kirkland Lake.
Toburn Gold Mines, Ltd.	217 Bay St., Toronto.	Kirkland Lake.
Wawa Gold Fields, Ltd.	616 Canada Cement Bldg., Montreal, Que.	Wawa.
Wayne Sturgeon River Mining Syndicate.	1821 Canadian Bank of Commerce Bldg., Toronto.	Sturgeon River.
Wendigo Mines, Ltd.	601 Usher Bldg., Toronto.	Kenora Dist.
Wells Long Lac Mines, Ltd.	171 Yonge St., Toronto.	Geraldton.
West Side Long Lac Mines, Ltd.	372 Bay St., Toronto.	Thunder Bay Dist.
Wright-Hargreaves Mines, Ltd.	Liberty Bank Bldg., Buffalo, N.Y., U.S.A.	Kirkland Lake.
Young-Davidson Mines, Ltd.	c/o Hollinger Mine, Timmins.	Matatchewan.
MANITOBA—		
Bailor Gold Mines, Ltd.	505 Union Trust Bldg., Winnipeg.	Beresford Lake.
Black River Gold Mines.	232 Curry Bldg., Winnipeg.	Rice Lake.
Brooks God's Lake Gold Mines, Ltd.	801 Bank of Hamilton Bldg., Toronto, Ont.	God's Lake.
Central Manitoba Mines, Ltd.	Paris Bldg., Winnipeg.	Wadhope.
Clover Gold Mines, Ltd.	1207 McArthur Bldg., Winnipeg.	Beresford Lake.
Consolidated Goldfields of Manitoba, Ltd.	941 Somerset Bldg., Winnipeg.	Rice Lake.
Coupland Gold Mines, Ltd.	67 Yonge St., Toronto, Ont.	Island Lake.
Diana Gold Mines, Ltd.	67 Yonge St., Toronto, Ont.	Gem Lake.
Forty-Four Mines, Ltd.	237 Curry Bldg., Winnipeg.	Rice Lake.
Gabrielle Mines, Ltd.	903 McArthur Bldg., Winnipeg.	Bissett.
Garry God's Lake Mines, Ltd.	204 Royal Bank Bldg., Toronto, Ont.	God's Lake.
God's Lake Gold Mines, Ltd.	395 Main St., Winnipeg.	God's Lake.
Gunnar Gold Mines, Ltd.	2301 Star Bldg., Toronto, Ont.	Beresford Lake.
Highland Enterprise Mining Co., Ltd.	505 Huron & Erie Bldg., Winnipeg.	Falcon Lake.
Island Lake Mines, Ltd.	395 Main St., Winnipeg.	Island Lake.
Jowsey Island Gold Mines, Ltd.	395 Main St., Winnipeg.	God's Lake.
Kiskoba Mining Co., Ltd.	Winnipeg.	Herb Lake.
Knee Lake Gold Mines, Ltd.	395 Main St., Winnipeg.	God's Lake.
Laguna Gold Mines, Ltd.	602/350 Bay St., Toronto, Ont.	Herb Lake.
Lake Maron Gold Mines, Ltd.	1005 Federal Bldg., Toronto, Ont.	Reed Lake.
Little God's Lake Syndicate, Ltd.	1116 Federal Bldg., Toronto, Ont.	God's Lake.
Mandalay Gold Mines, Ltd.	205 Enderton Bldg., Winnipeg.	Beresford Lake.
Manco Gold Mines, Ltd.	Lumsden Bldg., Toronto, Ont.	Elbow Lake.
Maskwa Lake Gold Mines, Ltd.	701 Great West Permanent Bldg., Winnipeg.	Maskwa Lake.
Midfield Gold Mines, Ltd.	504 Kensington Bldg., Winnipeg.	Rice Lake.
Normandy Gold Mines, Ltd.	601 Union Trust Bldg., Winnipeg.	Rice Lake.
Oro Grande Development Co., Ltd.	1207 McArthur Bldg., Winnipeg.	Beresford Lake.
Oro Plata Mining Co., Ltd.	1005 Federal Bldg., Toronto, Ont.	Reed Lake.
Packsack Mines, Ltd.	395 Main St., Winnipeg.	Rice Lake.
Ranger Gold Mines, Ltd.	941 Somerset Bldg., Winnipeg.	Rice Lake.
San Antonio Gold Mines, Ltd.	237 Curry Bldg., Winnipeg.	Beresford Lake.
Scattergood Manitoba Gold, Ltd.	201 Somerset Bldg., Winnipeg.	Beresford Lake.
Scotia Gold Mines, Ltd.	290 Garry St., Winnipeg.	Beresford Lake.
Smelter Gold Mines, Ltd.	1104 Bank of Hamilton Bldg., Toronto, Ont.	God's Lake.
Stevenson Lake Gold Mines, Ltd.	395 Main St., Winnipeg.	Stevenson Lake.
Tinney Lake Gold Mines, Ltd.	362 Main St., Winnipeg.	Wadhope.
Vanson Manitoba Gold Mines, Ltd.	610 McArthur Bldg., Winnipeg.	Rice Lake.
Wallace Lake Gold Mines, Ltd.	403 Scott Block, Winnipeg.	Rice Lake.
Wingold Mines, Ltd.	403 McIntyre Bldg., Winnipeg.	Bissett.
Wylie Dominion Gold Mines, Ltd.	2200 Sterling Tower, Toronto, Ont.	Wylie Station.
SASKATCHEWAN—		
Consolidated Mining & Smelting Company of Canada, Ltd.	Trail, B.C.	Amisk Lake.
Flin Flon Gold Mining Syndicate, Ltd.	601 Avenue Blk., Winnipeg, Man.	Douglas Lake.
Great Bear Lake Mines, Ltd.	601 Usher Bldg., Toronto, Ont.	Athabasca Lake.
Wekach Lake Gold Mines, Ltd.	290 Garry St., Winnipeg, Man.	Wekach Lake.

DIRECTORY OF FIRMS—Continued

Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
BRITISH COLUMBIA—		
Alma N. Mining Co.....	511 Fidelity Bldg., Tacoma, Wash., U.S.A.	Nelson Div.
*Ashloo Gold Mining Syndicate.....	411 Bank of Nova Scotia Bldg., Vancouver.	Squamish.
*Atlin-Ruffner Mines, Ltd.....	1405 1st and Guarantee Bldg., Toronto, Ont.	Atlin Lake.
*B. C. Cariboo Gold Fields.....	1824 Marine Bldg., Vancouver.	Moyie.
*Blue Jack Mines, Ltd.....	706 Metropolitan Bldg., Vancouver.	McGuire.
*Blue Hawk Gold Mines Syndicate.....	2083 Byron St., Victoria.	Kelowna.
*Bradian Mines, Ltd.....	555 Burrard St., Vancouver.	Lillooet Dist.
*Bralorne Mines, Ltd.....	555 Burrard St., Vancouver.	Bralorne.
*Bunker Hill Gold Mines, Ltd.....	Nelson.	Nelson.
*B. R. X. Gold Mines, Ltd.....	816 Hall Bldg., Vancouver.	Lillooet Dist.
*Buena Vista Mining Co., Ltd.....	1 rail.	Stewart.
*Camp McKinney Gold Hill Mining Co., Ltd.	703 Dominion Bank Bldg., Vancouver.	Yale Dist.
*Caroni Gold Mines, Ltd.....	804 Standard Bank Bldg., Vancouver.	Caroni.
*Canada Smelters, Ltd.....	Sanca.	Sanca.
*Cariboo Gold Quartz Mining Co., Ltd.	615 Bower Bldg., Vancouver.	Wells.
*Cariboo Yankee Belle Mining Co., Ltd.	425 Standard Bank Bldg., Vancouver.	Keithley.
*Chiles Explorations, Ltd.....	918 Rogers Bldg., Vancouver.	Boulder Lake.
*Clubine Comstock Gold Mines, Ltd.....	Nelson.	Boulder Creek.
*Columario Consolidated Gold Mines, Ltd.	1910 Kent Bldg., Toronto, Ont.	U.S.
*Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.	Fish Lake, Upper Salmon Valley.
Danzig Mines, Ltd.....	Nootka.	Nootka Sound.
Dawson Consolidated Gold Mines, Ltd.....	716 Hall Bldg., Vancouver.	Jessica.
Dentonina Mines, Ltd.....	200 Lancaster Bldg., Calgary, Alta.	Greenwood.
*Dictator Gold Mines, Ltd.....	Penticton.	Edgewood.
*Durango Gold Mines, Ltd.....	712 Standard Bank Bldg., Vancouver.	Nelson.
*Dynamo Mining & Milling Co., Ltd.....	1927 Marine Bldg., Vancouver.	Greenwood.
Engineer Mine (R. Brook).....	Mining Corporation of Canada, 350 Bay St., Toronto, Ont.	Atlin.
Euphrates Mining Co., Ltd.....	Box 677, Nelson.	Nelson.
*Fairview Amalgamated Gold Mines, Ltd.....	208 Pacific Bldg., Vancouver.	Osoyoos Div.
*Foster Ledge Gold Mines, Ltd.....	816 Hall Bldg., Vancouver.	Cariboo Dist.
*Frances Gold Mines, Ltd.....	210 Pemberton Bldg., Victoria.	Bridge River, Kamloops.
*Gem Gold Mines, Ltd.....	955 Thurlow St., Vancouver.	Texada Island.
*Gold Belt Mining Co., Ltd.....	Box 544, Nelson.	Salmo.
*Goldfinch Gold Mines, Ltd.....	320 Pemberton Bldg., Victoria.	Cambarne.
*Gold Standard Mining Co., Ltd.....	Penticton.	Fairview Dist.
*Good Hope Mine.....	Box 1089, Nelson.	Nelson.
*Granby Consolidated Mining, Smelting & Power Co., Ltd.....	Hall Bldg., Vancouver.	Granby Point.
*Grull-Wihkne Gold Mines, Ltd.....	1007 Royal Bank Bldg., Vancouver.	Bridge River Dist.
*Gun Lake Gold Mines, Ltd.....	816 Hall Bldg., Vancouver.	Lillooet Dist.
*Grandoro Mines, Ltd.....	Box 474, Penticton.	Osoyoos Div.
*Grange Mines, Ltd.....	Burrard St., Vancouver.	Clinton.
*Haida Gold Mines, Ltd.....	612 Stanard Bank Bldg., Vancouver.	Queen Charlotte Islands.
*Hercules Consolidated Mining, Smelting & Power Co., Ltd.....	618 Vancouver Bldg., Vancouver.	Nanaimo Dist.
*Home Gold Mining Co., Ltd.....	614 Rogers Bldg., Vancouver.	Jessica.
*Ideal Gold & Nickel Mines, Ltd.....	612 Vancouver Bldg., Vancouver.	Yale Dist.
*Imperial Leasing Syndicate.....	Rock Creek.	Greenwood.
*Island Mt. Mines Co., Ltd.....	744 West Hastings St., Vancouver.	Cariboo Div.
*I. X. L. Leasors, Ltd.....	Rossland.	Rossland.
*Jenny Long Gold Mines.....	547 Howe St., Vancouver.	Nicola Div.
*Kelowna Exploration Co., Ltd.....	Hedley.	Hedley.
*Kennedy Lake Gold Mines, Ltd.....	1214 Broad St., Victoria.	Kennedy Lake Dist.
*Kootenay Belle Gold Mines, Ltd.....	470 Granville St., Vancouver.	Salmo.
*Kootenay Nevada Mines, Ltd.....	1012 Royal Bank Bldg., Vancouver.	Nelson.
*Lillooet Lake Mining Co., Ltd.....	North Bend.	Fire Mountain.
*Livingstone Mining Co., Inc.....	Taghum.	Taghum.
*Lytton Gold Mines, Ltd.....	1110 E. 15th Avenue, Vancouver.	Lytton.
*Mak Siccar Gold Mines, Ltd.....	124 Pacific Bldg., Vancouver.	Similkameen.
*Martel Gold Mines, Ltd.....	607 Standard Bank Bldg., Vancouver.	Ashcroft Div.
McArthur, W. E., Jr.....	Box 629, Greenwood.	Greenwood and Grand Forks Divs.
McDaniel, E. H.....	Box 180, Nelson.	Trout Lake.
*Meridian Mining Co., Ltd.....	555 Howe St., Vancouver.	Lardeau Dist.
*Midnight Syndicate.....	Midnight Mine, Rossland.	Rossland.
*Minto Gold Mines, Ltd.....	Bridge River.	Lillooet Dist.
*Mix Gold Mines, Ltd.....	414/789 West Pender St., Vancouver.	Bridge River.
*Monashee Mines Syndicate, Ltd.....	312 Pacific Bldg., Vancouver.	Greenwood Mining Div.
*Morning Star Gold Mines, Ltd.....	840 West Hastings St., Vancouver.	Oliver.
*National Gold Mines, Ltd.....	502 Pacific Bldg., Vancouver.	McGillivray Falls.
*Nicola Mines & Metals, Ltd.....	210/602 Hastings St. W., Vancouver.	Stamp Lake.
*Noble Five Mines, Ltd.....	420 Baker St., Nelson.	Sandon and Nelson.
*Northern Reef Gold Mines, Ltd.....	704 Bank of Toronto Bldg., Victoria.	Omineca Mining Div.
*O. K. Leasing Syndicate.....	Box 167, Rossland.	Rossland.
*Oscarson Bros.....	Erie.	Nelson Mining Div.
*Osoyoos Mines, Ltd.....	105a-8th Avenue West, Calgary, Alta.	Osoyoos.
*Pacific Eastern Gold, Ltd.....	Pacific Bldg., Vancouver.	Pioneer.
*Pacific Golden West Syndicate.....	34/553 Granville St., Vancouver.	Bridge River.
*Patterson, T. F.....	Refuge Bay.	Skeena Div.
*Phillips Arm Consolidated Mines, Ltd.....	475 Howe St., Vancouver.	Fort Neville.
*Pickering, B. A.....	Box 557, Nelson.	West Kootenay.
*Pioneer Gold Mines, Ltd.....	605 Rogers Bldg., Vancouver.	Lillooet Dist.
*Precambrian Gold Mines.....	Smith Tower, Seattle, Wash., U.S.A.	Ewings Landing.

DIRECTORY OF FIRMS—Continued

Auriferous Quartz Mining Industry—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—Continued		
Premier Gold Mining Co., Ltd.	Royal Trust Bldg., Vancouver	Portland Canal.
*Proserpine Gold Mines, Ltd.	502 Pacific Bldg., Vancouver	Barkerville.
*Quesnelle Quartz Mining Co., Ltd.	1000 Hall Bldg., Vancouver	Hixon.
*Radio Gold Mines, Ltd.	612 Vancouver Blk., Vancouver	Omineca Mining Div.
*Reliance Gold Mines, Ltd.	1308 Northern Life Tower, Seattle, Wash., U.S.A.	Bridge River.
Relief-Arlington Mines, Ltd.	Erie.	Nelson Mining Div.
Reno Gold Mines, Ltd.	Yorkshire Bldg., Vancouver	Salmo.
Robertson, H. W.	Box 1133, Nelson.	Nelson Mining Div.
*Saddle Mines, Ltd.	c/o Britannia Mining & Smelting Co., Britannia Beach.	Quesnel Mining Div.
Salmo-Malartic, Ltd.	608/159 Bay St., Toronto, Ont.	Nelson Mining Div.
*Standard Gold Mines, Ltd.	716 Hall Bldg., Vancouver	Bridge River.
Superior Gold Mines, Ltd.	614 Stock Exchange Bldg., Vancouver	Greenwood.
*Sunloch Mines, Ltd.	Trail.	Jordan River.
Suri Point Mine (N. A. Timmins Corp.)	1010 Canada Cement Bldg., Montreal, Que.	Porcher Island.
Taylor, J. E. (Republic)	32 Fairfield Bldg., Vancouver	Greenwood.
*Taylor Windfall Gold Mining Co., Ltd.	102 Pacific Bldg., Vancouver	Clinton Mining Div.
*Trites Gold Mining Co., Ltd.	608 Pacific Bldg., Vancouver	Ymir.
Turner, T. H.	Columbia Gardens.	Nelson Mining Div.
Twin Lakes Gold Mining Co., Ltd.	Penticton.	Fairview Dist.
Union Mine (J. F. McCarthy)	Grand Forks.	Grand Forks.
Vancouver Island Gold Mines, Ltd.	678 Howe St., Vancouver	Alberni.
Velvet Gold Mining Co.	1309-7th Avenue, Seattle, Wash., U.S.A.	Rossland.
Victoria Fairview Mines, Ltd.	823 W. Hastings St., Vancouver	Oliver.
Vidette Gold Mines, Ltd.	312 Pacific Bldg., Vancouver	Savona.
*Viking Gold Mines, Ltd.	712 Standard Bank Bldg., Vancouver	Fairview Dist.
Walters, Williamson & Wanke.	Greenwood.	Greenwood Mining Div.
Waterloo Gold Mines, Ltd.	Penticton.	Lightning Peak.
Wayside Consolidated Gold Mines, Ltd.	Wayside via Bridge River	Lillooet Div.
*Wesko Exploration & Development Co., Ltd.	316 Hall Bldg., Vancouver	Nelson Mining Div.
*Widdowson, E. W.	Nelson.	Ymir.
Wilcox Mining Syndicate.	Box 235, Rossland.	Ymir.
Wilson Mining & Investment Co., Ltd.	506 Pacific Bldg., Vancouver	Smithers.
Windpass Gold Mining Co., Ltd.	744 Hastings St., Vancouver	Chu Chua.
Ymir Consolidated Gold Mines, Ltd.)	716 Hall Bldg., Vancouver	Ymir.
Ymir Dundee Gold Mining Co., Ltd.	Box 246, Nelson.	Ymir.
Ymir Yankee Girl Gold Mines, Ltd.	Ymir.	Nelson Mining Div.
NORTHWEST TERRITORIES—		
*Burwash Yellow Knife Mines, Ltd.	1112/85 Richmond St. W., Toronto, Ont.	Yellow Knife River.
YUKON—		
*Timmins Corp., N. A.	1010 Canada Cement Bldg., Montreal, Que.	Carmacks.

* Active but not producing.

Note.—Complex auriferous-sulphide ores that are mined essentially for their gold content are largely classified in this report under auriferous quartz.

Copper-Gold-Silver Mining Industry

QUEBEC—		
Aldermac Mines, Ltd.	941 Dominion Square Bldg., Montreal	Arntfield.
*Astoria Rouyn Mines, Ltd.	74 St. Paul St., Quebec	Rouyn.
*Bagamac Rouyn Mines, Ltd.	Haileybury, Ont.	Rouyn.
*Carlson Copper Syndicate.	New Liskeard, Ont.	Dugay Tp.
*Clericy Consolidated Mines, Ltd.	74 Sparks St., Ottawa, Ont.	Clericy Tp.
Consolidated Copper & Sulphur Co.	Eustis.	Eustis.
*Consolidated Mining & Smelting Company of Canada, Ltd.	Dominion Square Bldg., Montreal	Chibougamau.
Noranda Mines, Ltd.	804 Royal Bank Bldg., Toronto, Ont.	Rouyn, *Chibougamau.
*Normetal Mining Corp., Ltd.	350 Bay St., Toronto, Ont.	Desmeloizes Tp.
*Opemiska Copper Mines, Ltd.	25 King St. E., Toronto, Ont.	Opemiska Lake.
*Prospectors Airways, Ltd.	80 King St. W., Toronto, Ont.	Various claims.
*Robb-Monthray Mines, Ltd.	85 Richmond St. W., Toronto, Ont.	Monthray Tp.
*Syndicat Minier de Gaboury.	Guigues.	Gaboury Tp.
MANITOBA AND SASKATCHEWAN—		
Hudson Bay Mining & Smelting Co., Ltd.	Woodstock, Ont.	Flin Flon.
BRITISH COLUMBIA*—		
Britannia Mining & Smelting Co., Ltd.	Britannia Beach.	Vancouver, Mining Div.
Granby Consolidated Mining, Smelting & Power Co., Ltd.	Hall Bldg., Vancouver	Anyx.

x In addition to the companies listed there were numerous operators working under lease on the LeRoy, Centre Star and other mines.

* Active but not producing.

DIRECTORY OF FIRMS—Continued

Chrome Ore Mining Industry

Name	Head office address	Location
QUEBEC— Asbestos Corportion, Ltd..... Product—Chromite.	Canada Cement Bldg., Montreal.....	Thetford Mines.
Camire, Lucien..... Product—Chromite.	Thetford Mines.....	Eastern Townships.
ONTARIO— Chromium Mining & Smelting Corp., Ltd.... Product—Chromite and ferrochrome.	Bank of Commerce Bldg., Hamilton.....	Collins.

Iron Mining Industry

NOVA SCOTIA— Dominion Steel & Coal Corporation, Ltd.,....	Sydney.....	Bell Island, N'f'd.
QUEBEC— Baie St. Paul Titanic Iron Ore Co.....	Baie St. Paul.....	Charlevoix Co.

Manganese Mining Industry

NOVA SCOTIA— Atlantic Manganese Corp., Ltd.(*).. Product—Manganese ore.	Roy Bldg., Halifax.....	New Ross.
---	-------------------------	-----------

Molybdenite Mining Industry

QUEBEC— Height of Land Co.(*)..... Product—Molybdenite.	4327 Old Orchard Ave., Montreal.....	Abitibi Co.
ONTARIO— The Phoenix Molybdenite Corp., Ltd.(*).... Product—Molybdenite.	36 Toronto St., Toronto.....	Renfrew Co.
BRITISH COLUMBIA— Langley, A.(*)..... Product—Molybdenite.	Endako.....	Endako.
Hardscrabble Mine(*)..... Product—Molybdenite.	Barkerville.....	Barkerville.

Nickel-Copper Mining Industry

ONTARIO— Cuniptau Mines Development Co., Ltd.(*)...	465 Bay St., Toronto.....	Strathy Tp.
Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto.....	Falconbridge Tp.
International Nickel Company of Canada, Ltd	Copper Cliff.....	Copper Cliff, Coniston and Port Colborne.
BRITISH COLUMBIA— B. C. Nickel Mines, Ltd.(*).....	804 Standard Bank Bldg., Vancouver.....	Choate.

Non-Ferrous Smelting and Refining Industry

Copper Smelting Companies

Noranda Mines, Ltd.....	2 King St. E., Toronto.....	Noranda.
†International Nickel Co. of Canada, Ltd.....	67 Wall St., New York City, U.S.A.....	Copper Cliff and Coniston.
†Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto.....	Falconbridge.
Hudson Bay Mining & Smelting Co., Ltd.....	404 Dundas St., Woodstock.....	Flin Flon.
Granby Consolidated Mining, Smelting & Power Co., Ltd.....	789 Pender St. W., Vancouver.....	Anyox.

(*) Active but not producing.

† Smelt nickel-copper ores and produce platinum and other precious metals.

DIRECTORY OF FIRMS—Continued

Electrolytic Copper Refining Companies (a)

Name	Head office address	Location
Canadian Copper Refiners, Ltd.....	2 King St. E., Toronto.....	Montreal East.
Ontario Refining Co., Ltd.....	Copper Cliff.....	Copper Cliff.

Lead Smelting and Refining Companies

*Consolidated Mining & Smelting Company of Canada, Ltd.....	215 St. James St. W., Montreal.....	Trail.
---	-------------------------------------	--------

Electrolytic Zinc Refining Companies

†Consolidated Mining & Smelting Co. of Canada, Ltd.....	215 St. James St. W., Montreal.....	Trail.
†Hudson Bay Mining and Smelting Co., Ltd....	404 Dundas St. Woodstock.....	Flin Flon.

Smelters and Refiners of Cobalt-Silver-Arsenic Ores

*Deloro Smelting & Refining Co., Ltd.....	Deloro.....	Deloro.
---	-------------	---------

Refiners of Uranium-Radium Ores

Eldorado Gold Mines, Ltd.....	Star Bldg., Toronto.....	Port Hope.
-------------------------------	--------------------------	------------

Producers of Primary Aluminium

Aluminum Company of Canada, Ltd.....	Canada Life Bldg., Toronto.....	Arvida and Shawinigan Falls
--------------------------------------	---------------------------------	-----------------------------

* Produce bismuth or bismuth-bearing bullion as by-products.

† Produce cadmium or cadmium compounds as by-products.

(a) Also produce selenium and tellurium.

Silver-Cobalt Mining Industry(†)

Beaver Mine.....	10 Silver St., Cobalt, Ont.....	Cobalt.
Cobalt Properties, Ltd.....	Box 929, Cobalt, Ont.....	Cobalt.
(*)Cobnor Silver Mines, Ltd.....	North Cobalt, Ont.....	Cobalt.
Daniell, E. O. (McKinley-Darragh).....	Kirkland Lake, Ont.....	Cobalt.
Hudson Bay Mines, Ltd.....	New Liskeard, Ont.....	Cobalt.
Martin, Geo. (Crown Reserve).....	Box 659, Cobalt, Ont.....	Cobalt.
McKinley Mines Securities, Ltd.....	50 King St. W., Toronto, Ont.....	Cobalt.
Mining Corporation of Canada, Ltd.....	350 Bay St., Toronto, Ont.....	Cobalt.
Nipissing Mining Co., Ltd.....	Excelsior Life Bldg., Toronto, Ont.....	Cobalt.
O'Brien, M. J., Ltd.....	Victoria Bldg., Ottawa, Ont.....	Cobalt and Gowganda.
Peterson Cobalt Mines, Ltd.....	301 Royal Bank Bldg., Toronto, Ont.....	Cobalt.
Price, C. W. (Foster).....	Box 388, Cobalt, Ont.....	Cobalt.
Sandoe & Moyle.....	Box 362, Cobalt, Ont.....	Cobalt.
(*)Smith Cobalt Mines, Ltd.....	Cobalt, Ont.....	Cobalt.
(*)Windsor Cobalt Silvers, Ltd.....	213-414 Bay St., Toronto, Ont.....	Cobalt.
Wood, A. (Dominion Reduction Co.).....	Cobalt, Ont.....	Cobalt.

(*) Active but not producing.

(†) All properties located in Ontario.

DIRECTORY OF FIRMS—Continued

Silver-Lead-Zinc Mining Industry

Name	Head office address	Location
QUEBEC—		
(*)Estate Pierre Tetreault.....	70 Holyrood Ave., Outremont, Montreal...	Montauban les Mines.
(*)Federal Zinc & Lead Co., Ltd.....	Room 608, Drummond Bldg., Montreal.....	Gaspe Co.
(*)Lyalil & Beidelman.....	Room 608, Drummond Bldg., Montreal.....	Gaspe Co.
BRITISH COLUMBIA—		
Ainslie, Ray F.....	Slocan City.....	Slocan City.
Base Metals Mining Corp., Ltd.....	350 Bay St., Toronto, Ont.....	Field.
Beaver Silver Mines, Ltd.....	708 Yorkshire Bldg., Vancouver.....	Beaverdell.
Beaverdell Wellington Syndicate, Ltd.....	Greenwood.....	Beaverdell.
Bell Mine, Ltd.....	Box 464, Penticton.....	Beaverdell.
Black Coal Leasors.....	Sandon.....	Sandon.
Brown & Curwen.....	Ymir.....	Nelson Mining Div.
Campbell, C. J.....	4675-5th Ave. W., Vancouver.....	New Denver.
C. Q. Mining Co., Ltd.....	1840 Georgia St. W., Vancouver.....	Slocan City Mining Div.
Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Kimberley.
Doney, E., & Son.....	Box 17, Sandon.....	Slocan.
Dunwell Mines, Ltd.....	101 Pemberton Bldg., Victoria.....	Slocan.
Forshaw, Robt.....	Box 478, Greenwood.....	Greenwood.
(*)Gray, Anton.....	Box 216, Revelstoke.....	Camborne.
Graham, W. E.....	Slocan.....	Slocan.
Harbour, Herbert.....	Box 700, Nelson.....	Slocan.
Highland Lass, Ltd.....	Box 782, Kelowna.....	Beaverdell.
Jackson Mines, Ltd.....	804 Stock Exchange Bldg., Vancouver.....	Slocan.
Marzoli, S.....	Sandon.....	Kaslo Mining Div.
McCune, M. M.....	c/o H. Giegerich, Kaslo.....	Slocan.
Meteor Mining Co.....	Slocan City.....	Slocan.
Molly Hughes Syndicate.....	c/o Federal Land Bank, Spokane, Wash., U.S.A.....	Slocan.
Nordanan, J. L.....	Beaverdell.....	Beaverdell.
Olson, A. K.....	Sandon.....	Slocan.
Ruth-Hope Mining Co., Ltd.....	804 Stock Exchange Bldg., Vancouver.....	Sandon.
Sally Mines, Ltd.....	Box 220, Penticton.....	Beaverdell.
(*)Silversmith Mines, Ltd.....	Box 1032, Seattle, Wash., U.S.A.....	Sandon.
United Empire Gold & Silver Mining Co., Ltd.....	Standard Bank Bldg., Vancouver.....	Stewart.
Watkins, Howland & Moa.....	Hyder, Alaska.....	Portland Canal.
(*)Waverly Tangier Mines, Ltd.....	201/602 Hastings St. W., Vancouver.....	Albert Canyon.
Western Exploration Co., Ltd.....	Silverton.....	Silverton.
NORTH WEST TERRITORIES(a)—		
Bear Exploration & Radium, Ltd.....	1112/85 Richmond St. W., Toronto, Ont.....	Great Bear Lake Dist.
Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail, B.C.....	Great Bear Lake Dist.
Eldorado Gold Mines, Ltd.....	Star Bldg., Toronto, Ont.....	Great Bear Lake Dist.
(*)Great Bear Lake Mines, Ltd.....	244 Bay St., Toronto, Ont.....	Great Bear Lake Dist.
(*)White Eagle Silver Mines, Ltd.....	1006 Concourse Bldg., Toronto, Ont.....	Great Bear Lake Dist.
YUKON—		
Treadwell Yukon Co., Ltd.....	920 Crocker Bldg., San Francisco, Calif., U.S.A.....	Mayo Mining Dist.
York Investments, Ltd.....	804 Standard Bank Bldg., Vancouver, B.C.....	Keno Hill.

(a) Chiefly developing pitchblende, pitchblende-silver or silver ores.

NOTE.—Based on the value of the gold content of their ores, some important silver-lead producers are classified as gold mines and as such are listed in the directory contained in the Bureau of Statistics bulletin on the Canadian Gold Mining Industry.

Radium (Pitchblende) Mining Industry (b)

(*)Canada Radium Mines, Ltd.....	224 Bay St., Toronto, Ont.....	Haliburton Co., Ont.
Product—Pitchblende.		

(b) Also see under silver-lead-zinc mining industry.

Tungsten Mining Industry

(*)Indian Path Mines, Ltd.....	605 Dennis Bldg., Halifax, N.S.....	Lunenburg Co., N.S.
Product—Tungsten Ore.		

(*)Active but not producing.

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Head office address	Location District
NOVA SCOTIA—		
Acadia Coal Co., Ltd.	Stellarton	Pictou.
Bras d'Or Coal Co., Ltd.	Little Bras d'Or Bridge	Cape Breton.
Cumberland Railway & Coal Co., Ltd.	Springhill	Cumberland.
Dominion Coal Co., Ltd.	Sydney	Cape Breton.
Fundy Coal Co., Ltd.	Amherst	Cumberland.
Greenwood Coal Co., Ltd.	New Glasgow	Pictou.
Indian Cove Coal Co., Ltd.	Sydney Mine	Cape Breton.
Intercolonial Coal Co., Ltd.	Westville	Pictou.
Inverness Coal Mine	Inverness	Inverness.
Maritime Coal, Railway & Power Co., Ltd.	Amherst	Cumberland.
Nova Scotia Steel & Coal Co., Ltd.	Sydney	Cape Breton.
Shore Coal Co., Ltd.	Amherst	Cumberland.
Standard Coal Co., Ltd.	River Hébert	Cumberland.
Symons, J. F.	Port Hood	Inverness.
Victoria Coal Co., Ltd.	New Glasgow	Cumberland.
NEW BRUNSWICK—		
Avon Coal Co., Ltd.	Saint John	County
Evans, W. B.	Minto	Queens.
King, Gerald H.	Chipman	Queens.
Minto Coal Co., Ltd.	Minto	Queens.
Miramichi Lumber Co., Ltd.	Minto	Queens.
Newcastle Coal Co.	Minto	Queens.
Reade Construction Co., Ltd.	Chipman	Queens.
Welton, Harvey	Minto	Queens.
Welton & Henderson, Ltd.	Minto	Queens.
SASKATCHEWAN—		
Anderson, N.	Estevan	Municipality
Banks, H.	Taylorlton	Near Estevan.
Baniulis Bros.	Roche Percée	Near Pinto.
Bienfait Commercial Co.	Bienfait	Roche Percée.
Bienfait Mines, Ltd.	Bienfait	Near Bienfait.
Blue Flame Coal Mines, Ltd.	Leakville	Near Bienfait.
Crescent Collieries, Ltd.	Bienfait	Near Bienfait.
Eastern Collieries of Bienfait, Ltd.	Estevan	Near Bienfait.
Sinclair Mine	Roche Percée	Roche Percée.
Galloway, John	Estevan	Near Estevan.
Jenish Bros.	Estevan	Near Estevan.
Lignite Coal Mines, Ltd.	Pinto	Near Taylorlton.
Manitoba & Saskatchewan Coal Co., Ltd.	503 Avenue Block, Winnipeg, Man.	Near Bienfait (Taylorlton).
Moose Jaw Coal Mine, Ltd.	Regina	Near Leakville.
Poage, H. E.	Roche Percée	Roche Percée.
Shand Coal & Brick Co.	Shand	Shand.
Sinclair Mine	Roche Percée	Roche Percée.
Truax Traer Coal Co., Ltd.	Estevan	Near Estevan.
Ulrich & Matheson	Taylorlton	Taylorlton.
Western Dominion Collieries, Ltd.	Taylorlton	Taylorlton.
ALBERTA—		
Bituminous—		
Brazeau Collieries, Ltd.	Nordegg	Nordegg.
Cadomin Coal Co., Ltd.	Cadomin (mine office), Edmonton (business office)	Mountain Park.
Canmore Coal Co., Ltd.	Canmore	Cascade.
Hillcrest Collieries, Ltd.	Hillcrest	Crownest.
International Coal & Coke Co., Ltd.	Coleman	Crownest.
Luscar Collieries, Ltd.	Edmonton	Mountain Park.
McGillivray Creek Coal & Coke Co., Ltd.	Coleman	Crownest.
Mohawk Bituminous Mines, Ltd.	Bellevue	Crownest.
Mountain Park Collieries, Ltd.	410 Tegler Bldg., Edmonton	Mountain Park.
West Canadian Collieries, Ltd.	Blairmore	Crownest.
Sub-bituminous—		
Alexo Coal Co., Ltd.	Alexo	Saunders.
Bighorn & Saunders Creek Collieries, Ltd.	Saunders	Saunders.
Bryan Coal Co., Ltd.	Edmonton	Coalspur.
Coal Valley Mining Co., Ltd.	Coal Valley	Coalspur.
Foothills Collieries, Ltd.	Foothills	Coalspur.
Hinton Collieries, Ltd.	Hinton	Prairie Creek.
Jasper Coal Co., Ltd.	Edmonton	Prairie Creek.
Lakeside Coal, Ltd.	Edmonton	Coalspur.
McLeod River Hard Coal Co., Ltd.	Mercoal	Coalspur.
Sterling Collieries, Ltd.	Edmonton	Coalspur.
Lignite—		
Aetna Coal Co., Ltd.	Drumheller	Drumheller.
Alberta Block Coal Co., Ltd.	Drumheller	Drumheller.
Atlas Coal Co., Ltd.	East Coulee	Drumheller.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Concluded

Name	Head office address	Location District
ALBERTA—Concluded		
Lignite—Concluded		
Balogh Coal Co., Ltd.	Carbon	Carbon.
Beverley Coal Co., Ltd.	Edmonton	Edmonton.
Brilliant Coal Co., Ltd.	Drumheller	Drumheller.
Bush Mines, Ltd.	Edmonton	Edmonton.
Cadillac Coal Co., Ltd.	Lethbridge	Lethbridge.
Canadian Dinant Coal Co., Ltd.	Dinant	Camrose and Carbon.
Canadian Pacific Railway Co.	Dept. of Natural Resources, Calgary	Lethbridge.
Chinook Coal Co., Ltd.	Sheerness	Sheerness.
City of Lethbridge Coal Mines	Lethbridge	Lethbridge.
Dawson Coal Co., Ltd.	Edmonton	Edmonton.
Edina Coal Co., Ltd.	Edmonton	Edmonton.
Elgin Coal Co., Ltd.	Drumheller	Drumheller.
Empire Collieries, Ltd.	East Coulee	Drumheller.
Empire Collieries, Ltd.	Barnwell	Taber.
Fraser-Mackay Collieries, Ltd.	10055-101st St., Edmonton	Edmonton.
Fridel Red Hot Coal Co.	Edmonton	Edmonton.
Gibb, W. E.	Edmonton	Edmonton.
Great West Coal Co., Ltd. (Black Diamond Mine)	Edmonton	Edmonton.
Great West Coal Co., Ltd. (Star Mine)	Aerial	Drumheller.
Gunderson Brick, & Coal Co., Ltd.	Redcliff	Redcliff.
Hy-Grade Coal Co., Ltd.	Drumheller	Drumheller.
Ideal Coal Co., Ltd.	Wayne	Drumheller.
Jewel Collieries, Ltd.	Wayne	Drumheller.
Keith & Fulton Coal Co.	Edmonton	Edmonton.
Kent Coal Co., Ltd.	Edmonton	Edmonton.
Kleenbirn Collieries, Ltd.	Eyremore	Brooks.
Lakeside Coals, Ltd.	Edmonton	Pembina.
Larson, J. L.	Wheat Centre	Brooks.
Leavell Coal Co., Ltd.	Sheerness	Sheerness.
Lund, Nelson & Degaust	Lethbridge	Lethbridge.
Maple Leaf Minerals, Ltd.	Drumheller	Drumheller.
Marcus Coal Mines, Ltd.	Edmonton	Edmonton.
McDonell & Gwilliam	Namoo	Edmonton.
Midland Coal Mining Co., Ltd.	Midland vale	Drumheller.
Minute Coal Co.	Drumheller	Drumheller.
Murray Collieries, Ltd.	East Coulee	Drumheller.
Mutual Supplies, Ltd.	Wayne	Drumheller.
Newcastle Coal Co., Ltd.	Drumheller	Drumheller.
Olipphant, John	Medicine Hat	Redcliff.
Olipphant, J. H.	Carbon	Carbon.
Ottewell Coal Co.	Clover Bar	Edmonton.
Parker, L.	Cardiff	Edmonton.
Peerless Carbon Collieries	Carbon	Carbon.
Penn Coals, Ltd.	Edmonton	Edmonton.
Red Deer Valley Coal Co., Ltd.	Drumheller	Drumheller.
Rollingson, J.	Lethbridge	Lethbridge.
Rosedale Coal Co., Ltd.	Rosedale	Drumheller.
Royal Lethbridge Collieries	Lethbridge	Lethbridge.
Royalties Oil & Share Corp., Ltd.	Calgary	Lethbridge and Pembina.
Sinoski, M.	Strathcona	Edmonton.
Sovereign Coal Mining Co., Ltd.	Wayne	Drumheller.
Stoney Creek Collieries, Ltd.	Camrose	Camrose.
Super Heat Coal Co.	Ardley	Ardley.
Superior Grade Coal Co., Ltd.	Wayne	Drumheller.
Tofield Coal Co., Ltd.	Tofield	Tofield.
Tredway & Co.	Dodds	Tofield.
Western Gem Coal Co., Ltd.	Drumheller	Drumheller.
BRITISH COLUMBIA—		
Canadian Collieries (Dunsmuir), Ltd.	Nanaimo	Island.
Coalmont Collieries, Ltd.	Coalmont	Inland.
Corbin Collieries, Ltd.	Corbin	Crow's Nest Pass.
Crow's Nest Pass Coal Co., Ltd.	Fernie	Crow's Nest Pass.
Middlesboro Collieries, Ltd.	Merritt	Inland.
Pleasant Valley Mining Co., Ltd.	Princeton	Inland.
Tulameen Coal Mines, Ltd.	Princeton	Inland.
Western Fuel Corporation of Canada, Ltd.	Nanaimo	Island.
Wilson Mining & Investment Co., Ltd.	Vancouver	Inland.

Natural Gas Industry

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.....	Moncton.....	Stony Creek. <i>Field</i>
(b) Moncton Electricity & Gas Co., Ltd.....	Moncton.....	
QUEBEC—		
(a) Canadian Seaboard Oil & Gas Co., Ltd....	39 Broadway, New York City, U.S.A.....	Nicolet Co.
(a) Cartier Natural Gas Co., Ltd.....	167 Main St., Hull.....	Berthier and Chambly Cos.
(a) Mohr, Carl M.....	706 Insurance Exchange Bldg., Montreal.....	Berthier Co.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location <i>Field</i>
ONTARIO—		
Aome Gas & Oil Co., Ltd.	350 Bay St., Toronto	Middleton.
Ajax Oil & Gas Co., Ltd.	150 Bay St., Toronto	Dover, Middleton and Tuscarora.
Aloka Oil Co., Ltd.	57 Queen St. W., Toronto	Ancaster and Onondaga.
Amity Gas Co.	Kenmore, New York, U.S.A.	Canboro and Moulton.
Aragain Gold & Natural Gas Syndicate.	34 King St. E., Toronto	Canboro and Seneca.
Avery, Esmond.	539 Penobscot Bldg., Detroit, Mich., U.S.A.	Cayuga North.
Beacon Natural Gas Syndicate.	189 King St. N., Waterloo	Rainham and Walpole.
Beer, Geo.	Binbrook.	Binbrook.
Benn, A. S.	Hagersville.	Walpole.
Bertie Gas Syndicate.	Selkirk.	Bertie.
Binbrook Gas Co.	Binbrook.	Binbrook.
Blackheath Gas Co.	539 Penobscot Bldg., Detroit, Mich., U.S.A.	Seneca.
Border Cities Syndicate.	24 James St. N., Hamilton	Onondaga.
(b) Brantford Gas Co.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	
Broadway Gas Syndicate.	Jarvis	Walpole.
Buck, J. L.	Port Rowan	Walsingham South.
Gleny, D.	Dunnville.	Canboro.
Grand River Gas & Oil Syndicate.	Canfield.	Cayuga North.
Grand River Natural Gas Co., Ltd.	Welland.	Moulton.
Grimsby Natural Gas Co., Ltd.	Grimsby.	Caistor and Gainsboro.
Haldimand Gas Syndicate.	Cayuga.	Rainham.
Haldimand Natural Gas Syndicate.	Stevensville.	Bertie.
Highbank Oil, Ltd.	215 King St. W., Chatham	Raleigh.
Hill, A. W.	Coatsworth.	Tilbury East.
Hope Gas Syndicate.	43 Ontario St., St. Catharines	Moulton.
House & Harris.	Stevensville.	Bertie.
Ideal Gas Syndicate.	Fisherville.	Rainham.
Industrial Natural Gas Co., Ltd.	Jamestown, N.Y., U.S.A.	Bertie, Crowland, Humber- stone and Willoughby.
Jasperson, Bon.	Kingsville.	Gosfield South, Romney and Tilbury East.
Kelly Gas & Oil Syndicate.	357 Bay St., Toronto	Rainham and Walpole.
Kindy, D., & Son.	Selkirk.	Rainham.
Ladd & Kabana.	1002 Buhl Bldg., Detroit, Mich., U.S.A.	Tilbury East.
Ladd & Zeigen.	1002 Buhl Bldg., Detroit, Mich., U.S.A.	Tilbury East.
(b) Leamington, Town of	Leamington.	
Lincoln Gas Co., Ltd.	10 Adelaide St. E., Toronto	Caistor, Canboro, Gainsboro and Wainfleet.
Lindsay, William B., Estate of.	Canada Permanent Bldg., Edmonton, Alberta	Canboro, Rainham and Walpole.
(c) Lowbanks Drillers Gas Syndicate.	36-38 King St. E., Toronto	Moulton.
Lymburner Bros. & Webber.	Dunnville.	Moulton and Rainham.
Lynn Valley Natural Gas Syndicate.	112 Yonge St., Toronto	Oneida.
Manchester, James.	36 King St. E., Toronto	Rainham.
(b) Manufacturers Natural Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	
May-Gold Gas Co.	511 National Bldg., Toronto	Canboro.
McKechnie & Hussey.	Dunnville.	Canboro.
Melrose Oil & Gas Syndicate.	509 Kent Bldg., Toronto	Oneida.
Middleton-Norfolk Natural Gas Syndicate.	Tillsonburg.	Middleton.
Midfield Gas Co., Ltd.	312-313 Pigott Bldg., Hamilton	Cayuga North and Oneida.
Midwal Oil & Gas Co., Ltd.	5 Elmer Ave., Toronto	Middleton and Walsingham North.
Mohawk Gas & Oil Syndicate, Ltd.	421 Main St. E., Hamilton	Canboro, Oneida and Walpole.
(c) Monarch Natural Gas Syndicate.	Selkirk.	Walpole.
(c) National Gas Syndicate.	Dunnville.	Seneca.
Nelles Corners Gas Syndicate.	Nelles Corners	Cayuga North and Rainham
Niagara Natural Gas Co., Ltd.	401 Genesee Bldg., Buffalo, N.Y., U.S.A.	Moulton.
Sterling Gas Co., Ltd.	319 Bay St., Toronto	Walpole.
Stevensville Natural Gas & Fuel Co.	Stevensville.	Bertie.
Stover, F. H.	330 Bay St., Toronto	Dover.
Stromwell Syndicate.	Tillsonburg.	Moulton.
Sundy Gas Co.	Dunnville.	Canboro.
Superior Gas Syndicate.	Fisherville.	Rainham.
Sweets Corners Gas & Oil Syndicate.	Fisherville.	Rainham.
Tillsonburg Oil & Gas Co., Ltd.	224 Carlton St., Toronto	Middleton.
Union Gas Company of Canada, Ltd.	52 Fifth Ave., Chatham	Aldborough, Dawn, Dover, Euphemia Haldimand, Raleigh, Romney, Som- bra and Tilbury East.
Vacuum Gas & Oil Co., Ltd.	350 Bay St., Toronto	Middleton.
Walpole Gas Syndicate.	Cayuga.	Walpole.
Walter Gas Syndicate, Ltd.	3020 Bailey Ave., Buffalo, N.Y., U.S.A.	Canboro, Middleton, Towns- end and Woodhouse.
(d) Walwork Gas Co.	Simcoe.	Bayham.
Welland County Gas Syndicate.	Stevensville.	Bertie.
Western Ontario Natural Gas Co., Ltd.	Dunnville.	Canboro, Cayuga North, Dunn and Sherbrooke.
White Oil & Gas Co., Ltd.	Box 216, Sarnia	Seneca and Walpole.
MANITOBA—		
(a) Ligar Oil & Gas Co., Ltd.	Manitou.	Near Purves.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Concluded

Name	Head office address	Location Field
SASKATCHEWAN—		
(a) Altoba Gas Exploration Co.....	Box 28, Calgary.....	Manitou.
Lloydminster Gas Co., Ltd.....	Lloydminster.....	Lloydminster.
(a) Twin Provinces Oil Co., Ltd.....	Maple Creek.....	Near Maple Creek.
ALBERTA—		
Advance Oil Co., Ltd.....	Albertan Bldg., Calgary.....	Turner Valley.
Alberta Clay Products Co., Ltd.....	Medicine Hat.....	Medicine Hat.
Associated Oil & Gas Co., Ltd.....	200 Leeson-Linsham Block, Calgary.....	Turner Valley.
Baltac Oils, Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner Valley.
(b) Bow Island, Town of.....	Bow Island.....	
British Dominion Oil & Development Corp., Ltd.....	208 Dominion Bank Bldg., Calgary.....	Turner Valley
Calgary Power Co., Ltd.....	244 St. James St., Montreal, Que.....	Bassano.
Canadian Pacific Railway Co.....	Medicine Hat.....	Medicine Hat.
Canadian Western Natural Gas, Light, Heat & Power Co., Ltd.....	215-6th Ave. W., Calgary.....	Brooks.
Canadian Western Power & Fuel Co., Ltd.....	Redcliff.....	Redcliff.
Carleton Royalties, Ltd.....	123-8th Ave. W., Calgary.....	Turner Valley.
Century Royalties, Ltd.....	123-8th Ave. W., Calgary.....	Turner Valley.
Commonwealth Petroleum, Ltd.....	410 Lancaster Bldg., Calgary.....	Turner Valley.
Dalhousie Oil Co., Ltd.....	636-2nd St. W., Calgary.....	Turner Valley.
Director Royalties, Ltd.....	415 Bank of Nova Scotia Bldg., Vancouver, B.C.....	Turner Valley.
Dominion Glass Co., Ltd.....	1111 Beaver Hall Hill, Montreal, Que.....	Redcliff.
East Crest Oil Co., Ltd.....	409 Maclean Block, Calgary.....	Turner Valley.
Foothills Oil & Gas Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Freehold Oil Corp., Ltd.....	817 Lancaster Bldg., Calgary.....	Turner Valley.
Gold Standard Oils, Ltd.....	Wainwright.....	Wainwright.
Gunderson Brick & Coal Co., Ltd.....	Redcliff.....	Redcliff.
Highwood-Sarcee Oils, Ltd.....	61 Canada Life Bldg., Calgary.....	Turner Valley.
Home Oil Co., Ltd.....	744 Hastings St. W., Vancouver, B.C.....	Turner Valley.
Hudson's Bay Oil & Gas Co., Ltd.....	79 Main St., Winnipeg, Man.....	Viking.
Hylo Oils, Ltd.....	118 Renfrew Bldg., Calgary.....	Turner Valley.
Lowery Petroleum, Ltd.....	68 King St. E., Toronto, Ont.....	Turner Valley.
Maple Leaf Milling Co., Ltd.....	Medicine Hat.....	Medicine Hat.
Maple Leaf Oil Co., Ltd.....	1007 Stock Exchange Bldg., Vancouver, B.C.....	Fabyan.
Mar-Jon Oil Co., Ltd.....	827 Rogers Bldg., Vancouver, B.C.....	Turner Valley.
McLeod Oil Co., Ltd.....	233 Grain Exchange Bldg., Calgary.....	Turner Valley.
Medicine Hat, City of.....	Medicine Hat.....	Medicine Hat.
Mercury Oils, Ltd.....	303 Lancaster Bldg., Calgary.....	Turner Valley.
Merland Oil Company of Canada, Ltd.....	327-13th St. N.W., Calgary.....	Turner Valley.
Midfield Oil Co., Ltd.....	Turner Valley.....	Turner Valley.
Miracle Oils, Ltd.....	303 Lancaster Bldg., Calgary.....	Turner Valley.
Model Oils, Ltd.....	7 Cameron Block, Calgary.....	Turner Valley.
New McDougall-Segur Oil Co., Ltd.....	70 Union Bldg., Calgary.....	Turner Valley.
Northwest Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Northwest Royalties, Ltd.....	900 Lancaster Bldg., Calgary.....	Turner Valley.
Northwestern Utilities, Ltd.....	10124-104th St., Edmonton.....	Viking.
Ogilvie Flour Mills Co., Ltd.....	Medicine Hat.....	Medicine Hat.
Oil Investors, Ltd.....	225a-8th Ave. W., Calgary.....	Turner Valley.
Pacalta Oils, Ltd.....	317 Alberta Corner, Calgary.....	Turner Valley.
Premier Brick Co.....	Redcliff.....	Redcliff.
Publix Oil & Gas, Ltd.....	226 Examiner Bldg., Calgary.....	Turner Valley.
Range Oil & Gas Co., Ltd.....	101 Canadian Bank of Commerce Bldg., Calgary.....	Border.
Redcliff Pressed Brick Co.....	Redcliff.....	Redcliff.
Rialto Oils, Ltd.....	303 Lancaster Bldg., Calgary.....	Reserve.
Royalite Oil Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Southwest Petroleum Co.....	606-2nd St. W., Calgary.....	Turner Valley.
Spooner Oils, Ltd.....	1202-1st St. W., Calgary.....	Turner Valley.
Stirling Royalties, Ltd.....	123-8th Ave. W., Calgary.....	Turner Valley.
Suffield, Village of.....	Suffield.....	Suffield.
Vanalta, Ltd.....	Granville Island, Vancouver, B.C.....	Red Coulee.
(b) Wainwright Gas Co., Ltd.....	36 Dominion Bank Bldg., Edmonton.....	
Wayne Oils, Ltd.....	Wayne.....	Turner Valley.
Wellington Oil & Gas Co., Ltd.....	4 Central Bldg., Calgary.....	Turner Valley.
Wetaskiwin, City of.....	Wetaskiwin.....	Wetaskiwin.

NOTE.—(a) Drilling only.

(b) Distributing only.

(c) Producing wells drilled in 1934—No output reported.

(d) Dry well drilled in 1934.

Peat Industry

ONTARIO—		
Alfred Bog.....	Alfred.....	Alfred.
Countryman, G.....	Chesterville.....	Winchester Tp.
Fleming, J.....	Morewood.....	Winchester Tp.
Hummel, Wm.....	Chesterville.....	Winchester Tp.
Leas, Wm.....	Milverton.....	Ellice Tp.
Roe, Stephen.....	Milverton, R.R. 2.....	Elma Tp.
Stewart Bros.....	Chesterville.....	Winchester Tp.

DIRECTORY OF FIRMS—Continued

Crude Petroleum Industry

Name	Head office address	Location Field
NEW BRUNSWICK—		
New Brunswick Gas & Oil Fields, Ltd.....	Moncton.....	Stony Creek.
ONTARIO—(a)		
Armstrong, J. E., Estate of.....	Petrolia.....	Petrolia and Enniskillen.
Atkinson, John.....	Petrolia.....	Petrolia and Enniskillen.
Barnes, Henry.....	Oil Springs.....	Oil Springs.
Brock, Thos.....	Petrolia.....	Petrolia and Enniskillen.
Brookfield Oil & Gas, Ltd.....	Sarnia.....	Brooke.
Brown, J. F.....	Sarnia.....	Moore.
Bryson, G. C.....	Petrolia.....	Petrolia and Enniskillen.
Bunyan Oil & Gas Syndicate.....	Toronto.....	Brooke.
Byers Bros.....	Oil Springs.....	Oil Springs.
Byers, Mrs. Lydia.....	Oil Springs.....	Oil Springs.
Canadian Oil Refineries, Ltd.....	12 Strachan Ave., Toronto.....	Petrolia and Enniskillen.
Carlton, W. G.....	Petrolia.....	Petrolia and Enniskillen.
Colchester Oil & Gas Co.....	Toronto.....	Thamesville.
Cole, W. J.....	Petrolia.....	Petrolia and Enniskillen.
Collins, Matthew.....	Petrolia.....	Petrolia and Enniskillen.
Crocker-Parks Oil Co., Ltd., The.....	Oil Springs.....	Oil Springs.
Dennis, Charles.....	Oil Springs.....	Oil Springs.
Dennis, Welcome.....	Oil Springs.....	Oil Springs.
Dominion Petroleum Co., Ltd., The.....	Glencoe.....	Mosa.
Donald, George.....	Oil Springs.....	Oil Springs.
Duncan, D. A.....	Petrolia.....	Moore.
Edward, F. H.....	Petrolia.....	Petrolia and Enniskillen.
Fairbank, J. H., Estate of.....	Petrolia.....	Oil Springs.
Forsythe, A.....	Copleston.....	Petrolia and Enniskillen.
Gillespie, Wm. O.....	Petrolia.....	Petrolia and Enniskillen.
(b) Gregory, G. F.....	Petrolia.....	—
Hamlin, F. G.....	Petrolia.....	Petrolia and Enniskillen.
Hillis Bros.....	Oil Springs.....	Oil Springs.
Holmes, E. B.....	Bothwell.....	Bothwell.
Houston, Mrs. Annie.....	Petrolia.....	Petrolia and Enniskillen.
(b) Hussey, W. J.....	Petrolia.....	—
Howlett, Fred W., & Sons, Ltd.....	Petrolia.....	Petrolia and Enniskillen.
Kells, E. E.....	Petrolia.....	Petrolia and Enniskillen.
Kelly, J. E.....	Petrolia.....	Petrolia and Enniskillen.
Kerr, John, Estate of.....	Petrolia.....	Petrolia and Enniskillen.
Kettle, Robt.....	Petrolia.....	Petrolia and Enniskillen.
(b) Kiser Bros.....	Chatham.....	—
Lather, Arthur.....	Bothwell.....	Bothwell.
Levine, Harry.....	Petrolia.....	Petrolia and Enniskillen.
Lewis Bros.....	Oil Springs.....	Oil Springs.
(b) Merchant, F. J.....	Petrolia.....	—
McCrie, R. D.....	Bothwell.....	Bothwell.
McGill, J.....	Bothwell.....	Bothwell.
McGillivray, G. A.....	201 Mount Pleasant Ave., London.....	Oil Springs.
McMillan, D. C. and Warwick, J.....	Bothwell.....	Bothwell.
Miller, Agnes E.....	Petrolia.....	Petrolia and Enniskillen.
Mitchell, Chas.....	Oil Springs.....	Oil Springs.
Mitchell, Robert.....	Oil Springs.....	Oil Springs.
Mobey, Charles.....	Bothwell.....	Bothwell.
Morningstar, H. M.....	Oil Springs.....	Oil Springs.
Morningstar, L. H.....	Oil Springs.....	Oil Springs.
Ontario Lands & Oil Co., Ltd., The.....	Petrolia.....	Petrolia and Enniskillen.
Parks, Blako.....	Petrolia.....	Petrolia and Enniskillen.
Petrol Oil & Gas Co., Ltd.....	73 Adelaide St. W., Toronto.....	Dover.
Premier Oils, Ltd.....	539a St. Clair Ave. W., Toronto.....	Onondaga.
Producers Gas Corp., Ltd.....	320 Bay St., Toronto.....	Raleigh.
Rawson, W. J.....	Petrolia.....	Petrolia and Enniskillen.
Stoddard & Darke.....	16379 Westbrooke Ave., Detroit, Mich.....	Brooke.
Sutherland, B. M.....	52 Fifth St., Chatham.....	Oil Springs.
Union Gas Company of Canada, Ltd.....	Oil Springs.....	Dawn.
Warwick, J.....	Bothwell.....	Oil Springs.
(b) Willits, D. E.....	4181 Talbot St., London.....	Bothwell.
Wimmett, J. W. G.....	Oil Springs.....	Oil Springs.
Woodward, Wm.....	Petrolia.....	Petrolia and Enniskillen.
Yerks, Carlton S.....	Petrolia.....	Petrolia and Enniskillen.
Yerks, Frank.....	Petrolia.....	—
ALBERTA—		
Advance Oil Co., Ltd.....	Albertan Bldg., Calgary.....	Turner Valley.
Albertan Federated Oils, Ltd.....	c/o Security Trust Co., Ltd., Calgary.....	Turner Valley.
Associated Oil & Gas Co., Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner Valley.
*Associated Royalties, Ltd.....	Renfrew Bldg., Calgary.....	Turner Valley.
Baltac Oils, Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner, Valley.
British Dominion Oil & Development Corp., Ltd.....	208 Dominion Bank Bldg., Calgary.....	Turner Valley.
British Wainwright Oil & Development Co., Ltd.....	703 Paris Bldg., Winnipeg, Man.....	Wainwright.

(a) Producers of 500 barrels or more during the year, except in Brooke township where producers of 400 barrels and over are shown.

(b) Drillers only.

DIRECTORY OF FIRMS—Continued

Petroleum Industry—Concluded

Name	Head office address	Location Field
ALBERTA—Concluded		
Calmont Oils, Ltd.....	301 Toronto General Trust Bldg., Calgary...	Turner Valley.
Carleton Royalties, Ltd.....	123-8th Ave. W., Calgary.....	Turner Valley.
Century Royalties, Ltd.....	123-8th Ave. W., Calgary.....	Turner Valley.
Commonwealth Petroleum, Ltd.....	410 Lancaster Bldg., Calgary.....	Turner Valley.
Dalhousie Oil Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Devenish Petroleum, Ltd.....	300 Leeson-Lineham Block, Calgary.....	Skiff.
Director Royalties, Ltd.....	415 Bank of Nova Scotia Bldg., Vancouver, B.C.....	Turner Valley.
East Crest Oil Co., Ltd.....	409 Maclean Block, Calgary.....	Turner Valley.
Edalta Oils, Ltd.....	9918-107th St., Edmonton.....	Wainwright.
Edmonton Wainwright Oils, Ltd.....	Wainwright.....	Wainwright.
Foothills Oil & Gas Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
*Franco Oils Co.....	Cardston.....	Cardston.
Freehold Oil Corp., Ltd.....	817 Lancaster Bldg., Calgary.....	Turner Valley.
†Gas & Oil Products, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Gold Standard Oils, Ltd.....	Wainwright.....	Wainwright.
Hargal Oils, Ltd.....	1007 Stock Exchange Bldg., Vancouver, B.C.	Turner Valley and Wainwright.
*Highwood Royalties, Ltd.....	820-4th St. W., Calgary.....	Turner Valley.
Highwood Sarees Oils, Ltd.....	61 Canada Life Bldg., Calgary.....	Turner Valley.
Home Oil Co., Ltd.....	744 Hastings St. W., Vancouver, B.C.....	Turner Valley.
Homestead Oils, Ltd.....	303 Beveridge Bldg., Calgary.....	Turner Valley.
Hudson's Bay Oil & Gas Co., Ltd.....	79 Main St., Winnipeg, Man.....	Keho.
*Hunter Valley Oil Co., Ltd.....	508 Lougheed Bldg., Calgary.....	Hunter Valley.
Hylo Oils, Ltd.....	Renfrew Bldg., Calgary.....	Turner Valley.
Lowery Petroleum, Ltd.....	68 King St. E., Toronto, Ont.....	Turner Valley.
*Maple Leaf Royalties, Ltd. (Canadian Royalties).....	Central Bldg., Calgary.....	Turner Valley.
Mar-Jon Oil Co., Ltd.....	827 Rogers Bldg., Vancouver, B.C.....	Turner Valley.
*Maxmont Oil Co.....	Lundbreck.....	Watson Structure.
McLeod Oil Co., Ltd.....	203 Grain Exchange Bldg., Calgary.....	Turner Valley.
Mercury Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Merland Oil Company of Canada, Ltd.....	327-13th St. N.W., Calgary.....	Turner Valley.
Midfield Oil Co., Ltd.....	Turner Valley.....	Turner Valley.
Miracle Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Model Oils, Ltd.....	7 Cameron Block, Calgary.....	Turner Valley.
*Myers & Wright Royalties.....	112-7th Ave. E., Calgary.....	Turner Valley.
New McDougall-Segur Oil Co., Ltd.....	70 Union Bldg., Calgary.....	Turner Valley.
Northwest Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
*Northwest Royalties, Ltd.....	900 Lancaster Bldg., Calgary.....	Turner Valley.
Oil Investors, Ltd.....	225a-8th Ave. W., Calgary.....	Turner Valley.
Okalta Oils, Ltd.....	Renfrew Bldg., Calgary.....	Turner Valley.
Onalta Oil Co.....	Wainwright.....	Wainwright.
Pacalta Oils, Ltd.....	112-7th Ave. E., Calgary.....	Turner Valley.
*Pekisko Hills Co., Ltd.....	4 Central Bldg., Calgary.....	Pekisko.
*Phillips Petroleum, Ltd.....	Turner Valley.....	Turner Valley.
Publix Oil & Gas, Ltd.....	226 Examiner Bldg., Calgary.....	Turner Valley.
Regent Oil Co., Ltd.....	Grain Exchange Bldg., Calgary.....	Turner Valley.
*Renfrew Royalty Co., Ltd.....	225a-8th Ave. W., Calgary.....	Turner Valley.
Rialto Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Reserve Structure.
Richfield Petroleum, Ltd.....	225a-8th Ave. W., Calgary.....	Turner Valley.
*Richfield Royalties, Ltd.....	225a-8th Ave. W., Calgary.....	Turner Valley.
†Royalty Oil Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Sasko-Wainwright Oil & Gas, Ltd.....	Wainwright.....	Wainwright.
Southwest Petroleum Co., Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Spooner Oils, Ltd.....	1202 First St. W., Calgary.....	Turner Valley.
Sterling Royalties, Ltd.....	123-8th Ave. W., Calgary.....	Turner Valley.
Vanalta, Ltd.....	Granville Island, Vancouver, B.C.....	Red Coulee.
Vulcan Oils, Ltd.....	Vulcan.....	Turner Valley.
Wainwright Petroleum, Ltd.....	10625-99th Ave., Edmonton.....	Wainwright.
Wayne Oils, Ltd.....	Wayne.....	Turner Valley.
Wellington Oil & Gas Co., Ltd.....	4 Central Bldg., Calgary.....	Turner Valley.
Widney Oils, Ltd.....	229-8th Ave. W., Calgary.....	Turner Valley.
NORTHWEST TERRITORIES—		
Northwest Co., Ltd.....	606-2nd St. W., Calgary.....	Fort Norman.

* Drilling only.

† Operates an absorption plant.

‡ In addition to operating wells in the Turner Valley field this company operates an absorption plant.

OTHER NON-METAL MINING INDUSTRIES

Actinolite Mining Industry

Name	Head office address	Location
ONTARIO— The Actinolite Mining Co.....	1429 Chomedey St., Montreal, P.Q.....	Kaladar, Ont.

Asbestos Mining Industry*

Asbestos Corporation, Ltd.....	Canada Cement Bldg., Montreal, P.Q.....	Thetford Mines. East Broughton. Black Lake. Coleraine. Asbestos.
Canadian Johns-Manville Co., Ltd.....	Montreal, P.Q.....	Thetford Mines, Coleraine.
Johnson's Co.....	Thetford Mines West, P.Q.....	Thetford Mines.
Keasbey & Mattison Co.....	Ambler, Pa., U.S.A.....	Thetford Mines.
Nicolet Asbestos Mines, Ltd.....	c/o Greenshields & Greenshields, Transportation Bldg., Montreal, P.Q.....	Wotton Tp., Tingwick Tp.
Northern Asbestos Co., Ltd.....	Box B1, Thetford Mines, P.Q.....	Thetford Mines.
Quebec Asbestos Corp., Ltd.....	East Broughton, P.Q.....	East Broughton.

* All plants located in the province of Quebec.

Barytes

ONTARIO— *Canada Night Hawk Mines, Ltd.....	Room 305, 372 Bay St., Toronto.....	Porcupine Area.
--	-------------------------------------	-----------------

* Not producing.

Bituminous Sands

ALBERTA— Absand Oils, Ltd.....	3703 Northern Ontario Bldg., Toronto, Ont..	Northern Alberta.
*Bituminous Sand Extraction Co., Ltd.....	507 MacLean Block, Calgary.....	Northern Alberta.
McMurray Asphaltum & Oil, Ltd.....	Petrolia, Ont.....	Northern Alberta.

* Active but not producing.

Diatomite

NOVA SCOTIA— International Diatomite Industries, Ltd.....	206 Patriot Bldg., Concord, N.H.....	Little River, East New Annan.
ONTARIO— Diatomite Refiners Co.....	45 Richmond St. W., Toronto.....	Novar.
Diatomite Products, Ltd.....	c/o A. C. Clark, 302 Bay St., Toronto.....	Martin Siding.
BRITISH COLUMBIA— B.C. Refractories, Ltd.....	660 Taylor St. Vancouver.....	Quesnel.
Hind, W. H.....	Vancouver.....	Burnaby Lake.

Feldspar and Quartz Mining Industry

NOVA SCOTIA— (a) Dominion Steel & Coal Corp., Ltd.....	Sydney.....	Leitches Creek.
(a) Smith, R. M., and MacDougall, J. D.....	Port Hood.....	Melford.
QUEBEC— Bertrand, W.....	Buckingham.....	Derry Tp.
(a) Bigelow, E. M., and Stewart, Wm.....	Glen Almond.....	Gatineau Dist.
(a) Bigelow, Robt. A.....	Buckingham.....	Buckingham Dist.
(*) Canadian Carborundum Co., Ltd.....	Box 65, Niagara Falls, Ont.....	St. Canut.
(a) Canadian Flint & Spar Co., Ltd.....	Box 340, Buckingham.....	Buckingham.
(a) Canadian Kaolin Silica Products, Ltd.....	660 St. Catherine St. W., Montreal.....	St. Remi d'Amherst.
(a) Canadian Silica Products, Ltd.....	81 Tache St., Chicoutimi.....	Roberval.
(a) Côté, Hector.....	R. R. 4, Sherbrooke.....	Sherbrooke Dist.
(a) Couture, Edmond.....	Glen Almond.....	Glen Almond.
Derry Mining Co.....	Buckingham.....	Derry Tp.
Donaldson, Robt. J.....	Glen Almond.....	Buckingham Tp.
Evans, W. H.....	Box 386, Buckingham.....	Buckingham Tp.
(a) Flint Sands, Ltd.....	24 King St. W., Toronto, Ont.....	St. Bruno de Guigues.
(a) Gordon, Alfred.....	Brigham.....	Missisquoi Co.
McClements, Albert.....	Buckingham.....	Buckingham Dist.
McDonnell, B. A.....	Glen Almond.....	Derry Tp.
(a) McDonnell, Edmond.....	Buckingham.....	Buckingham Dist.
McDonnell, James.....	Glen Almond.....	Buckingham Dist.

DIRECTORY OF FIRMS—Continued

Feldspar and Quartz Mining Industry—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
(a) McLean-McNicoll, Ltd.....	609 Confederation Bldg., Montreal.....	Labelle.
O'Brien & Fowler, Ltd.....	Box 340, Buckingham.....	Derry Tp.
(a) Ottawa Silica & Sandstone, Ltd.....	East Templeton.....	East Templeton.
Parcher, Alfred.....	Glen Almond.....	Derry Tp.
Pedneaud, G.....	Buckingham.....	Buckingham Dist.
(a) Rivest, Zorila.....	St. Sulpice.....	Assomption Co.
Toutloff, Frank, and Wallingford, A.....	Gatineau Point.....	Gatineau Dist.
(a) Warwick, Wm.....	Glen Almond.....	Gatineau Dist.
Whitfield, T.....	Buckingham.....	Buckingham Dist.
Winning, Bush.....	Notre Dame de la Salette.....	Buckingham Dist.
ONTARIO—		
Anderson, J. G., & Son.....	Lucknow.....	Britt and Warren.
(a) Barnes, W. R.....	Hamilton.....	Springvale.
Barr, Walter J.....	Westmeath.....	Renfrew Co.
Bathurst Feldspar Mines, Ltd.....	230 King St. E., Toronto.....	Lanark Co.
Charette, S., & Son.....	Estaire.....	Burwash.
Chayer, Leo.....	Warren.....	Warren Station.
Craig, T. H.....	10 Victoria St., Perth.....	Lanark Co.
(a) Dominion Mines & Quarries, Ltd.....	Canada Life Bldg., Toronto.....	Killarney.
(x) Frontenac Floor & Wall Tile Co., Ltd.....	Kingston.....	Kingston.
Gunter, Judson A.....	Princes Lake.....	Nipissing Dist.
MacDonald, P.....	Hybla.....	Derybe.
(a) Wright & Co.....	960 Queen St., Sault Ste. Marie.....	Deroche Tp.
MANITOBA—		
(a) Lake Bar Sand & Gravel Co., Ltd.....	307 Scott Block, Winnipeg.....	Black Island.
Winnipeg River Tin Mines, Ltd.....	c/o Dysons, Ltd, Winnipeg.....	Pointe du Bois.

(a) Reported production of silica only.

(*) Operated grinding plants.

NOTE.—In addition to these operators, metallurgical plants in Ontario, Manitoba, Saskatchewan and British Columbia produced silica flux for their own use.

Fluorspar

ONTARIO—		
Stocklosar, Chas. A.....	Box 198, Madoc.....	Hastings Co.

Garnets

QUEBEC—		
* La Belle Mining, Inc.....	4203 Brebeuf, Montreal.....	Joly Tp., Labelle Co.

* Active but not producing.

Graphite

QUEBEC—		
* Canadian Graphite Corporation.....	1193 Phillips Place, Montreal.....	Boyer Tp.
ONTARIO—		
Black Donald Graphite Co., Ltd.....	Calabogie.....	Brougham Tp.

* Company now inactive.

Grindstones, Pulpstones and Sharpening Stones

NOVA SCOTIA—		
The Read Stone Co., Ltd.....	Box 549, Sackville, N.B.....	Quarry Island.
NEW BRUNSWICK—		
National Trust Co., Ltd. (Miramichi Quarry Co., Ltd.).....	225 St. James St., Montreal, P.Q.....	Quarryville.
The Read Stone Co., Ltd.....	Box 549, Sackville.....	Stonehaven.
Smith, E. A.....	Box 79, Shediac.....	Shediac.
BRITISH COLUMBIA—		
J. A. and C. H. McDonald, Ltd.....	1571 Main St., Vancouver.....	Gabriola Island and Vancouver.

Gypsum Mining Industry

NOVA SCOTIA—		
Atlantic Gypsum Products Co.....	40 Central St., Boston, Mass., U.S.A.....	Aspy Bay, Chéticamp and Walton.
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Wentworth.
The Connecticut Adamant Plaster Co.....	10 River St., New Haven, Conn., U.S.A.....	Chéverie.
The Nova Scotia Coal & Gypsum Co., Ltd.....	Box 13, Mabou.....	Mabou Harbour.
North American Gypsum Co.....	96 Curtis Ave., Rutland, Vt., U.S.A.....	Baddeck Bay.
Windsor Gypsum Co.....	Box 727, Newburgh, N.Y., U.S.A.....	Newport Station.
Windsor Plaster Co., Ltd.....	Windsor.....	Brooklyn, Hants Co.

DOMINION BUREAU OF STATISTICS

DIRECTORY OF FIRMS—Continued

Gypsum Mining Industry—Concluded

Name	Head office address	Location
NEW BRUNSWICK— Canadian Gypsum Co., Ltd..... Thompson, F. M.....	1221 Bay St., Toronto, Ont..... Hillsborough.....	Hillsborough. Petitcodiac Co.
ONTARIO— Canadian Gypsum Co., Ltd..... Gypsum, Lime and Alabastine, Canada, Ltd.	1221 Bay St., Toronto..... Paris.....	Hagersville. Caledonia.
MANITOBA— Gypsum, Lime and Alabastine, Canada, Ltd. Western Gypsum Products, Ltd.....	Paris, Ont..... 503 McArthur Bldg., Winnipeg.....	Gypsumville. Amaranth.
BRITISH COLUMBIA— Gypsum, Lime and Alabastine, Canada, Ltd.	Paris, Ont.....	Falkland.

Iron Oxides Mining Industry

QUEBEC— Argall, Thos. H..... *Montmorency Paint Products Co., Ltd..... The Sherwin-Williams Company of Canada, Ltd..... McNicol, Eugene.....	639 St. Angel, Three Rivers..... 6684 St. Urbain St., Montreal..... 2375 Centre St., Montreal..... 354 St. Catherine St. W., Montreal.....	La Pointe du Lac. Les Forges. Red Mill. Labelle Co.
BRITISH COLUMBIA— Davidson, J. G., and Thompson, J. H.....	3498 Marine Drive, Vancouver.....	Mons.

* No production reported in 1934.

Magnesitic Dolomite

QUEBEC— Canadian Refractories, Ltd..... International Magnesite Co., Ltd.....	1050 Canada Cement Bldg., Montreal..... Calumet.....	Grenville Tp. Harrington Tp.
BRITISH COLUMBIA— *Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Marysville.

* No production reported in 1934.

Magnesium Sulphate

BRITISH COLUMBIA— Epsom Refineries, Ltd.....	395 Main St., Winnipeg, Man.....	Kamloops, Dist.
---	----------------------------------	-----------------

Manganese Bog

NEW BRUNSWICK— *Singleton, Clarence.....	North Renous.....	North Renous.
---	-------------------	---------------

* Active but not producing.

Mica Mining Industry

QUEBEC— (*)Ahearn, W..... (a)Blackburn Bros., Ltd..... Brown Bros..... Cleary, G..... Cross, W. C..... Flynn, B. J..... Martin, A. G..... (*)McGlashan, Wm..... Wallingford Bros., Ltd.....	538 McLaren St., Ottawa, Ont..... Blackburn Bldg., Ottawa, Ont..... Cantley, P. Q..... Wilson's Corners, P. Q..... 209 Bridge St., Hull, P. Q..... 33 Montcalm St., Hull, P. Q..... 236 Besserer St., Ottawa, Ont..... Wilson's Corners, P. Q..... Perkins, P. Q.....	Hull Tp. Templeton Tp. Hull Tp. Gatineau Tp. Hull Tp. Hull Dist. Hull Tp. and Wakefield Tp. Wakefield Tp. Hull Tp.
ONTARIO— Kent Bros..... Lee, W. W., & Son..... Loughborough Mining Co. Ltd..... Martin, A. G..... Thirty Island Lake, Mica Co.....	Kingston Ont..... Bedford Mills Ont..... Sydenham, Ont..... 236 Besserer St., Ottawa, Ont..... Verona, Ont.....	Kingston. Bedford Tp. Sydenham. Ottawa. Thirty Island Lake.
BRITISH COLUMBIA— (a)B.C. Refractories, Ltd..... (b)Roy, P. M.....	660 Taylor St., Vancouver, B.C..... Prince Rupert, C.B.....	Armstrong. Baker Inlet.

(*) Active but not shipping.
(a) Operates a grinding plant.
(b) Mines sericite.

DIRECTORY OF FIRMS—Continued

Mineral Waters (Natural)

Name	Head office address	Location
QUEBEC—		
Abenakis Springs Co.....	Blondin.....	Yamaska Co.
Bellemarre Josaphat.....	St. Maurice.....	St. Maurice.
Eau Minérale Etoile.....	St. Geneviève de Batiscan.....	St. Geneviève de Batiscan.
Fernet, J. G.....	Berthierville, R.R. 2.....	Berthierville, R.R. 2.
Gélinas, Ezilda.....	St. Sévère.....	St. Maurice Co.
Gurd, Chas., & Co., Ltd.....	1016 Bleury St., Montreal.....	Varennes.
La Cie Embouteillage d'Eau.....	3 St. Germain St., St. Hyacinthe.....	St. François du Lac.
La Cie Embouteillage St. Laurent.....	64 St. Pierre St., St. Hyacinthe.....	St. Hyacinthe.
La Cie d'Eau Minérale.....	143 Concorde St., St. Hyacinthe.....	St. Hyacinthe le Confesseur.
Maski Bottling Works.....	Maskinongé.....	Maskinongé.
Pellerin, Albert.....	St. Barnabé Nord.....	St. Maurice Co.
Radnor Mineral Water Springs.....	St. Maurice.....	St. Maurice.
Richard, Girard.....	St. Grégoire.....	St. Grégoire.
Source, Coulombia.....	L'Epiphanie.....	L'Epiphanie.
ONTARIO—		
Boyd, T. R.....	Carlsbad Springs.....	Carlsbad.
Deneault, F.....	Bourget.....	Bourget.
Gurd, Chas., & Co., Ltd.....	016 Bleury St., Montreal, P.Q.....	Caledonia Springs.

Phosphate

QUEBEC—		
Mageau, Donat.....	Notre-Dame de la Salette.....	Villeneuve.
McGlashan, R. J.....	Hull.....	Buckingham Dist.
St. Amour, Abie.....	Notre-Dame de la Salette.....	Buckingham Dist.
BRITISH COLUMBIA—		
The Consolidated Mining & Smelting Co. of Canada, Ltd.*.....	Trail, B.C.....	Crowsnest, Fernie.

*Inactive in 1934.

Pyrites (Sulphur)

QUEBEC—		
Aldermac Mines, Ltd.(x).....	941 Dominion Square Bldg., Montreal.....	Boischatel Tp.
Consolidated Copper & Sulphur Co., Ltd.(*)..	Eustis.....	Ascot Tp.
ONTARIO—		
International Nickel Co. of Canada, Ltd.(a)..	Coppér Cliff.....	Copper Cliff.
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Company of Canada, Ltd.(a).....	Trail.....	Trail.
Britannia Mining & Smelting Co., Ltd.(*)....	Britannia Beach.....	Britannia Beach.

(*)Pyrites concentrated from copper ore.

(a)Salvaged smelter gas.

Salt Industry

NOVA SCOTIA—		
Malagash Salt Co., Ltd.....	204 Provost St., New Glasgow.....	Malagash.
ONTARIO—		
Brunner, Mond, Canada, Ltd.....	Canadian Bank of Commerce Bldg., Toronto	Amherstburg.
Canadian Industries, Ltd.....	P.O. Box 1260, Montreal, P.Q.....	Sandwich.
The Dominion Salt Co., Ltd.....	Sarnia.....	Sarnia.
Goderich Salt Co., Ltd.....	Box 577, Goderich.....	Goderich.
The Walker Salt Corp., Ltd.(*).....	Port Franks.....	Port Franks.
Warwick Pure Salt Co., Ltd.....	R.R. 5, Watford.....	Lambton Co.
Western Canada Flour Mills Co., Ltd.....	287 MacPherson Ave., Toronto.....	Goderich.
MANITOBA—		
Neepawa Salt Co., Ltd.....	Neepawa.....	Neepawa.
SASKATCHEWAN—		
Simpson Oil Co., Ltd.....	Simpson.....	Simpson.

(*) First produced in 1935.

Silica Brick

NOVA SCOTIA—		
Dominion Steel & Coal Corp., Ltd.....	Sydney.....	Sydney.
ONTARIO—		
Algoma Steel Corp., Ltd.....	Sault Ste. Marie.....	Sault Ste. Marie.

DIRECTORY OF FIRMS—Continued

Sodium Carbonate

Name	Head office address	Location
BRITISH COLUMBIA— B.C. Sodium Syndicate..... Bishop, James A.(a).....	Kamloops..... Clinton.....	Cherry Creek. Clinton.

Sodium Sulphate

SASKATCHEWAN— Alexander, W. R..... Dominion Sodium Refineries, Ltd..... *Eastcrest Holding & Development Co..... Horseshoe Lake Mining Co., Ltd..... *Midwest Chemical Co..... *Muskiki Sulphates, Ltd..... Natural Sodium Products, Ltd..... Saskasul, Ltd..... Sodium Corporation, Ltd..... *Sodium Sulphate Co. of Saskatchewan, Ltd..... White Shore Salts & Chemicals Co., Ltd.....	831 D. North, Saskatoon..... 513 Lougheed Bldg., Calgary, Alta..... Calgary, Alta..... Ormiston..... Palo..... Muskiki Lake..... 409 Walter Scott Bldg., Moose Jaw..... 513 Westman Chambers, Regina..... 302 Bay St., Toronto, Ont..... 1753 Rose St., Regina..... 1371 George St., North Battleford.....	Viscount. Fusilier. Oban. Ormiston. Palo. Muskiki Lake. Frederick Lake. Watrous. Alsask. Sec. 1, T. 4, R. 2, W. 2. White Shore Lake.
---	--	--

* Idle in 1934.

Talc and Soapstone Industry

QUEBEC— Broughton Soapstone & Quarry Co., Ltd..... Fortin, Charles..... Pharo, L. C.....	Broughton Station..... Robertsonville..... Thetford Mines.....	Broughton Station. Thetford Tp. Thetford Tp.
ONTARIO— Canada Talc, Ltd..... Gillespie, Geo. H..... Henderson Mines, Ltd.....	Madoc..... Madoc..... Madoc.....	Hastings Co. Madoc. Hastings Co.
BRITISH COLUMBIA— B. C. Refractories, Ltd..... Kennedy, J. J.....	660 Taylor St., Vancouver..... Sooke Lake.....	Anderson Lake. Sooke Lake.

Volcanic Dust

SASKATCHEWAN— Chadwick, A. W.....	1178 Osler St., Regina.....	Waldeck.
BRITISH COLUMBIA— G. G. Groome.....		Williams Lake.

Clay Productions and Other Structural Materials

CLAY PRODUCTS INDUSTRY

Brick, Tile, Clay and Sewer Pipe

Name	Head office address	Location
NOVA SCOTIA—		
Brooks, Stephen, & Son (a).....	Box 359, New Glasgow.....	New Glasgow.
Miller, Jas. B.....	Elmsdale, Hants Co.....	Barney Brook.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax.....	Lantz Siding, Hants Co.
Standard Clay Products, Ltd.....	St. Johns, P.Q.....	New Glasgow.
NEW BRUNSWICK—		
Little River Brick Co., Ltd.....	Little River.....	Little River.
Ryan, M., & Son, Ltd.....	Fredericton.....	Fredericton.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax.....	Chipman.
QUEBEC—		
Ascot Tiles & Brick Co., Ltd.....	Ascot Corner.....	Richmond Co.
Bégin, Olivier.....	St. Sauveur de Québec.....	R.R. 1, St. Sauveur de Québec.
Bourbeau, Georges, & Fils.....	R.R. 1, Danville.....	Kingsley Falls.
Brunelle, L. H.....	Box 273, Victoriaville.....	St. Victoire.
Canadian Kaolin Silica Products.....	660 St. Catherine St. W., Montreal.....	St. Rémi d'Amherst.
Champlain Brick, Ltd.....	56 Laliberté St., Québec.....	Beauport East.
Chicoutimi Brick, Ltd.....	Chicoutimi.....	Chicoutimi.
Citadel Brick, Ltd.....	14 St. Joseph St., Québec.....	L'Islet Station, Boischatel and Lauzon.
Duquette, Isidore.....	Box 626, East Angus.....	Westbury Tp.
Hodgins, David T.....	Box 114, Shawville.....	Clarendon Tp.
Laprairie Co., Inc.....	660 St. Catherine St. W., Montreal.....	Laprairie and Delson.
Montreal Terra Cotta Co., Ltd.....	Dominion Square Bldg., Montreal.....	Lakeside.
Panet Brick Co., Ltd.....	L'Islet Station.....	L'Islet Station.
Parrot, M. H.....	Deschailions.....	Deschailions.
Potvin, Alphonse.....	Deschailions.....	Deschailions.
Richmond Brick Co.....	Richmond.....	Richmond.
Scott Brick Co., Ltd.....	15 St. Joseph St., Québec.....	Dorchester Co.
Standard Clay Products, Ltd.....	Box 189, St. Johns.....	St. Johns.
St. Lawrence Brick Co., Ltd.....	1010 St. Catherine St. W., Montreal.....	Laprairie.
St. Tite Industrial, Ltd.....	St. Tite.....	St. Tite.
ONTARIO—		
Barnhardt, W. H.....	Stratford.....	Stratford.
Brampton Pressed Brick Co., Ltd.....	Brampton.....	Chinquacousy Tp.
Broadwell, B., & Son.....	Kingsville.....	Essex Co.
Campbell, N. F., & Son.....	West Lorne.....	Elgin Co.
Canadian Pressed Brick Co., Ltd.....	195 Ottawa St. S., Hamilton.....	Hamilton.
Casemore, R., & Son.....	Shallow Lake.....	Shallow Lake.
Chapman Bros.....	145 Daves Rd., Toronto.....	East York Tp.
Construction Materials, Ltd.....	New Toronto.....	York Co.
Cooksville Co., Ltd.....	120 St. James St. W., Montreal, P.Q.....	Cooksville.
Coultis, George, & Son.....	Theford.....	Lambton Co.
Cowell, Geo. W.....	Box 361, Tillsonburg.....	Oxford Co.
Crag, Booth, Ltd.....	New Toronto.....	N. York.
Curtin, F., Estate.....	R.R. 4, Lindsay.....	Victoria Co.
Curtis Bros.....	Box 809, Peterboro.....	Otonabee and Douro Tps.
Deller, Albert, & Son.....	Brownsville.....	Oxford Co.
Deller Bros.....	R.R. 2, Norwich.....	Oxford Co.
Deller, Wm. H.....	R.R. 4, Thorndale.....	W. Nissouri Tp.
Denison Tile Co., Ltd.....	Windsor.....	Fletcher, Tilbury East Tp., Rochester Tp.
Dochart Brick, Tile & Terra Cotta Works.....	Arnprior.....	Arnprior.
Dolan, John, & Sons.....	R.R. 2, Watford.....	Lambton Co.
Douglas & Douglas.....	Wilkesport.....	Lambton Co.
Dover Brick & Tile Works.....	Chatham.....	Dover Tp.
Donaldson, Thos. Geo.....	R.R. 1, Greenock.....	Culross Tp.
Elliott, Chas.....	Bluevale.....	Turnberry Tp.
Elliott, James, Jr.....	Sault Ste. Marie.....	Korah Tp.
Elliott, Wm.....	Glenannon.....	Bruce Co.
Fort William Brick Co.....	Fort William.....	Fort William.
Frid Bros., Ltd.....	Main W. and Macklin Sts., Hamilton.....	Hamilton.
Gardiner, Wm.....	Box 83, Blenheim.....	Kent Co.
Godfrey, Thos., & Co.....	Carleton Place.....	Beckwith Tp.
Gomoll Brick & Tile Works.....	Powassan.....	Hinsworth Tp.
Grimsby Brick & Tile, Ltd.....	Grimsby.....	Grimsby.
Hamilton Pressed Brick Co., Ltd.....	Kensington Ave. S., Hamilton.....	Wentworth Co.
Harper Brick Works.....	348 Greenwood Ave., Toronto.....	York Co.
Hill, A. W.....	R.R. 1, Coatsworth.....	Tilbury E. Tp.
Hitch, D. A.....	Ridgetown.....	Ridgetown.
Hitch, Thomas.....	Box 254, St. Thomas.....	Elgin Co.
Hodder, Mrs. J. H., & Sons.....	Dutton.....	Dunwich.
Howlett, Fred W., & Sons, Ltd.....	Box 3, Petrolia.....	Petrolia and Brigden.
Huntsville Brick Works.....	Box 308, Huntsville.....	Muskoka.
Interprovincial Brick Co., Ltd.....	120 St. James St. W., Montreal, P.Q.....	Chinquacousy Tp., Nassagaweya Tp.
Jamieson Lime Co.....	Renfrew.....	Renfrew.
Janes, D. A.....	Mt. Brydges.....	Caradoc Tp.

(a) Includes production of refractories.

DIRECTORY OF FIRMS—Continued

Brick, Tile, Clay and Sewer Pipe—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Jasperson Brick & Tile Co.....	Kingsville.....	Coatsworth.
Jervis, W. J.....	R.R. 3, Dorchester.....	N. Dorchester.
Johnson, James, Estate.....	R.R. 3, Pembroke.....	Stafford Tp.
Koebel Bros.....	Box 3, St. Clements.....	Waterloo Co.
Lindsay, Earl, & Sons.....	R.R. 2, Wallaceburg.....	Chatham Gore Tp.
McComb, Chester.....	R.R. 2, London.....	Middlesex Co.
McCormick Bros.....	R.R. 5, Watford.....	Lambton Co.
McEachran, N., & Son.....	Highgate.....	Orford Tp.
McFarlane, W. J.....	Forest.....	Forest.
Milton Brick, Ltd.....	1153 Bay St., Toronto.....	Milton and Streetsville.
Moulton, John.....	R.R. 2, Holyrood.....	Bruce Co.
Napanee Brick & Tile Works.....	R.R. 3, Napanee.....	N. Fredericksburg Tp.
National Fire Proofing Co. of Canada, Ltd..	211 Dominion Bank Bldg., Toronto, 2	Aldershot.
National Sewer Pipe Co., Ltd.....	Aldershot.....	Hamilton, Swansea and East Flamboro Tp.
New Liskeard Brick Works.....	Box 74, New Liskeard.....	New Liskeard.
Ontario Brick & Tile Plant (Government).....	Provincial Secretary, Parliament Building, Toronto.....	Mimico.
O'Reilly, Thos.....	329 Bay St., Ottawa.....	Prescott Highway.
Ott Brick & Tile Manufacturing Co., Ltd.....	Kitchener.....	Kitchener.
Ottawa Brick & Terra Cotta Co., Ltd.....	Billings Bridge.....	Gloucester Tp.
Owen Sound Brick Co., Ltd.....	Owen Sound.....	Owen Sound.
Parks, H. W., Estate.....	R.R. 2, Dresden.....	Camden Tp.
Paxton, Fred, R.....	70 Herrick Ave., St. Catharines.....	St. Catharines.
Phinn, Geo. A.....	St. James Park P.O., London.....	Middlesex Co.
Phippen, H. W., & Son.....	Dawes Rd, Toronto.....	East York.
Port Rowan Brick & Tile Co.....	Port Rowan.....	Port Rowan.
Richardson, J., & Son.....	Kerwood.....	Kerwood.
Rollins, D. W.....	Belleville.....	Thurlow Tp.
Snelgrove, A.....	Bayverton.....	Ontario Co.
Sproat & Sproat.....	R.R. 4, Seaforth.....	Tuckersmith Tp.
Standard Brick Co., Ltd.....	500 Greenwood Ave., Toronto.....	Toronto.
Sun Brick & Tile Co., Ltd.....	1104 Bay St., Toronto.....	Don Valley.
Superior Brick & Tile Co., Ltd.....	428 Victoria Ave., Port William.....	Paiponge Tp.
Thompson, Ralph.....	Henfryn.....	Huron Co.
Tope, Richard, Brick Works.....	677 Main St. W., Hamilton.....	Hamilton.
Toronto Brick Co., Ltd.....	397 Bay St., Toronto.....	Milton, Toronto and York Tp.
Wagstaff, Chas.....	R.R. 4, Lindsay.....	Lindsay.
Wallace, R., & Son.....	Toronto General Trust Corp., 253 Bay St., Toronto.....	Widdifield Tp.
Wein, Aaron.....	Crediton.....	Huron Co.
Weitzel, John E.....	R.R. 1, Tavistock.....	Oxford Co.
Wright, Geo., & Sons.....	Comber.....	Comber.
MANITOBA—		
Alsip Brick, Tile & Lumber Co., Ltd.....	537 Portage Ave., Winnipeg.....	Winnipeg.
Marion Brick Co.....	Box 30, St. Boniface.....	St. Boniface.
Snyder Brick Yards, Ltd.....	Portage la Prairie.....	Portage la Prairie.
Wardrop, D. M.....	Whitemouth.....	Whitemouth.
SASKATCHEWAN—		
Dominion Fire Brick & Clay Products, Ltd(a)	Moose Jaw.....	Claybank.
International Clay Products, Ltd.(a).....	Box 399, Estevan.....	Estevan and Prince Albert.
Shand Coal & Brick Co.....	Shand.....	Shand.
ALBERTA—		
Acme Brick Co., Ltd.....	125 Alberta Block, Edmonton.....	Cannell Siding.
Alberta Clay Products Co., Ltd.(a).....	Box 672, Medicine Hat.....	Medicine Hat.
Gunderson Brick & Coal Co., Ltd.....	Redcliff.....	Redcliff.
Johansen, K.....	Box 1722, Grand Prairie.....	Grand Prairie.
Little, J. B., & Sons, Ltd.....	Edmonton.....	Edmonton.
Medicine Hat Brick & Tile Co., Ltd.....	Medicine Hat.....	Medicine Hat.
Redcliff Premier Brick Co., Ltd.....	Redcliff.....	Redcliff.
Redcliff Pressed Brick Co., Ltd.(a).....	Redcliff.....	Redcliff.
BRITISH COLUMBIA—		
Baker Brick & Tile Co., Ltd.....	3191 Douglas St., Victoria.....	Victoria.
B. C. Refractories, Ltd.(a) (b).....	660 Taylor St., Vancouver.....	Williams Lake and Princeton.
Christian Community of U. B., Ltd.....	Brilliant.....	Grand Forks.
Clayburn Co., Ltd.(a).....	850 West Hastings St., Vancouver.....	Kilgard.
Gabriola Shale Products, Ltd.....	1304 Broad St., Victoria.....	Gabriola Island.
Glover, Frank(b).....	Princeton.....	Princeton.
Gorse, Percy A.....	Salmon Arm.....	Enderby.
Haug, Wm., & Son.....	Box 166, Kelowna.....	Kelowna.
Port Haney Brick Co., Ltd.....	846 Howe St., Vancouver.....	Port Haney.
Vancouver Brick & Tile Co., Ltd.....	2521 Maple St., Vancouver.....	Sullivan.

(a) Includes production of refractories.

(b) Includes production of bentonite.

DIRECTORY OF FIRMS—Continued

Stoneware and Pottery

Name	Head office address	Location
NEW BRUNSWICK— Foley Pottery, Ltd.(a).....	Loch Lomond Road, Saint John.....	Saint John.
ONTARIO— Foster Pottery Co..... London Pottery Mfg. Co.....	Main St. W., Hamilton..... 95 Rectory St., London.....	Hamilton. London.
ALBERTA— Medalta Potteries, Ltd.....	Medicine Hat.....	Medicine Hat.
BRITISH COLUMBIA— B. C. Clay Products Co.....	3439 Euclid Ave., Vancouver.....	Vancouver.

(a) Includes production of refractories.

OTHER STRUCTURAL MATERIALS

Cement Industry

QUEBEC— Canada Cement Co., Ltd..... National Cement Co., Ltd.....	Box 290, Station B, Montreal..... Box 170, Station Hochelaga, Montreal.....	Hull and Montreal East. Montreal East.
ONTARIO— Canada Cement Co., Ltd..... St. Mary's Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q..... 357 Bay St., Toronto.....	Belleville, Lakefield and Port Colborne. St. Marys.
MANITOBA— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q.....	Fort Whyte and Steep Rock.
ALBERTA— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q.....	Exshaw.
BRITISH COLUMBIA— British Columbia Cement Co., Ltd..... Coast Cement Co., Ltd.....	Belmont House, Victoria..... Granville Island, Vancouver.....	Bamberton and Tod Inlet. Granville Island.

Lime Industry

NOVA SCOTIA— Dominion Steel & Coal Corp., Ltd..... Eastern Lime Co., Ltd.....	Sydney..... Windsor.....	Sydney. Windsor.
NEW BRUNSWICK— Bathurst Power & Paper Co., Ltd..... Purdy & Green, Ltd..... Randolph & Baker, Ltd..... Saint John Lime Co..... Snowflake Lime, Ltd.....	Bathurst..... 323 Main St., Saint John..... Randolph..... Brookville..... 3 Pokiok Road, Saint John.....	Bathurst. Saint John. Randolph. Brookville. Saint John.
QUEBEC— Arnaud & Beaudry..... Boivin, Arthur..... Canada Lime Products Co..... Canada Lime & Stone, Ltd..... Dominion Lime Co..... Filion, Narcisse..... Gagné, Octave..... Héon & Héon..... Laurentian Stone Co., Ltd..... Lalumière, Joseph..... Limoges, Henri..... Mercure, C..... Montreal Lime Co., Ltd..... National Stone & Lime Co., Reg'd..... Shawinigan Chemicals, Ltd..... Standard Lime Co., Ltd..... Trottier, David.....	Joliette..... Pont Rouge..... 7403 Drolet St., Montreal..... St. Marc des Carrières..... Lime Ridge..... St. Joachim..... St. Ulric..... St. Louis de Champlain..... 195 Nicholas St., Ottawa..... St. Dominique de Bagot..... 552 Poupart St., Montreal..... 9 rue St. Denis, St. Hyacinthe..... St. Marc des Carrières..... 386 rue Lemoine, Montreal..... Power Bldg., Montreal..... Joliette..... St. Marc des Carrières.....	Joliette. Pont Rouge. Cap St. Martin. St. Marc des Carrières. Lime Ridge. St. Joachim. St. Ulric. St. Louis de Champlain. Hull. St. Dominique de Bagot. Montreal. St. Dominique de Bagot. Ville St. Michel. St. Marc des Carrières. Shawinigan Falls. Joliette and St. Marc des Carrières. St. Marc des Carrières.
ONTARIO— American Cyanamid Co..... Bell, Harry..... Brown's Lime Works..... Brunner, Mond Canada, Ltd..... Cameron, W. M.....	30 Rockefeller Plaza, New York City, U.S.A. R.R. 4, Chesley..... 491-9th Ave. E., Owen Sound..... Canadian Bank of Commerce Bldg., Toronto Carleton Place.....	Niagara Falls. Grey Co. Owen Sound. Amherstburg. Carleton Place.

DIRECTORY OF FIRMS—Continued

Lime Industry—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Canada & Dominion Sugar Co., Ltd.	Chatham	Chatham and Wallaceburg.
Canada Lime Co., Ltd.	114 Cluny Drive, Toronto	Coboconk.
Canadian Gypsum Co., Ltd.	Windsor, N.S.	Guelph.
Chalmers Lime Works.	Owen Sound.	Owen Sound.
Dominion Rock Products, Ltd.	941 Dominion Square Bldg., Montreal, P.Q.	Eganville.
Gallagher Lime & Stone Co., Ltd.	Upper James St., Hamilton	Barton Tp.
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris.	Oxford Tp., Oxford Co., Glen Christie and Nas- sagaweya Tp.
Innerkip Lime & Stone Co., Ltd.	Beachville.	Beachville.
Jamieson Lime Co.	Renfrew.	Renfrew.
Morris, Stanley.	Delta.	Delta.
Rockwood Lime Co.	Rockwood.	Eramosa, Concession 5.
Shane Lime Co.	Eganville.	Eganville.
Toronto Brick Co., Ltd.	897 Bay St., Toronto	Coboconk.
Weppler, Henry.	Priceville.	Grey Co.
MANITOBA—		
Gillis Quarries, Ltd.	Spruce and Richard Sts., Winnipeg.	Winnipeg.
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris, Ont.	Winnipeg.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg	Spearhill and Stonewall.
ALBERTA—		
Canadian Sugar Factories, Ltd.	Raymond.	Raymond.
Loder's Lime Co., Ltd.	Kananaskis.	Kananaskis.
Summit Lime Works.	Box 273, Lethbridge.	South half Sec. 7, Twp. 8, Rge. 5, W. 5th.
BRITISH COLUMBIA—		
Lyon, F.	Hedley.	Hedley.
Pacific Mills, Ltd.	Ft. Raymur Ave., Vancouver	Ocean Falls.
Pacific Lime Co., Ltd.	744 West Hastings St., Vancouver.	Blubber Bay.
Reno Gold Mines, Ltd.	Yorkshire Bldg., Vancouver.	Salmo.

Sand and Gravel

NOVA SCOTIA—		
Campbell, M. J.	Boisdale.	Boisdale.
Nova Scotia, Dept. of Highways.	Halifax.	Various.
Walker, A. G.	Bridgetown.	Bridgetown.
NEW BRUNSWICK—		
Anderson, A. W.	Fairville.	Fairville.
Likely, Jos. A., Ltd.	Saint John.	East Saint John.
Maxwell, Chas. & Son.	R. R. 3, St. Stephen.	St. Stephen.
New Brunswick Dept. of Highways.	Fredericton.	Various.
QUEBEC—		
Ball, Clayton.	Abbotsford.	Abbotsford.
Barbe, Alfred.	Ste. Rose West.	Ste. Rose West.
Béland, A.	St. Agapit Station.	St. Agapit Station.
Béland, Eusèbe.	St. Agapit Station.	St. Agapit Station.
Bélanger & Bertrand.	L'Orignal, Ont.	Temiskaming.
Bélanger, Joseph.	Ascot Corner.	Ascot Corner.
Bélisle, Euclide.	Coaticook.	Coaticook.
Bejamin, Pierre.	197 St. Pierre St., St. Jean.	St. Jean.
Bennett, Gertrude.	Box 403, Lennoxville.	Lennoxville.
Bergeron, Ursin.	Jonquière.	Jonquière.
Berthiaume, Chas. Ed.	Contrecoeur.	Contrecoeur.
Bigras, Omer.	Ste. Rose West.	Ste. Rose West.
Bitumen Products Corp.	3590 St. Patrick St., Montreal.	Various.
Bonner Sand & Ballast, Ltd.	1434 St. Catherine St. W., Montreal.	South Durham and Abbotsford.
Bourgeois, Edmond.	St. Albert de Warwick.	St. Albert.
Bourget, Hubert.	R. R. 1, St. Joseph.	St. Joseph.
Brouillet Sand & Gravel.	Box 195, Rawdon.	St. Julien.
Cabana, Alphonse.	Contrecoeur.	Contrecoeur.
Canadian Good Roads Construction, Ltd.	2020 Union Ave., Montreal.	Shefford Tp.
Canadian Rock Products, Ltd.	2020 Union Ave., Montreal.	St. Louis de Gonzague, Huntingdon, Foster and Waterloo.
Chabot, Osias.	St. Jean Baptiste de Rouville.	St. Jean.
Chabot, Mde. Stanislas.	St. Jean Baptiste de Rouville.	St. Jean.
Chadwick, Thomas.	St. Gilles.	St. Gilles.
Coaticook, Town of.	100 Child St., Coaticook.	Coaticook.
Compagnie de Sable, Ltée.	10-3ième Ave., Limouilou.	St. Charles River.
Consolidated Oka Sand & Gravel Co., Ltd.	248 McCord St., Montreal.	Lake of Two Mountains.
Crawford, J. J.	Eastman.	Eastman.
Demers, Aimé.	St. Agapit Station.	St. Agapit Station.
Demers, Joseph.	Kateville.	Kateville.
Department of National Defence.	Quebec.	Valcartier.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Continued

Name	Head office address	Location
QUEBEC—Continued		
Desgagné, Honorius	St. Fulgence	St. Fulgence.
Deslandes, Mastai	St. Dominique	St. Dominique.
Desrochers, Oscar	Warwick	Warwick.
Dominion Sand & Stone Co., Ltd.	1472 Laurier Est., Montreal	South Durham.
Dubreuil, Albert	St. Dominique	St. Dominique.
Duchéne, Joseph	Hébertville	Hébertville.
Dumont & Damours Enrg.	Rivière du Loup Centre	Trois Pistolles.
Dupont, Albini	Magog	Magog.
Durand, Albert	St. Jérôme	St. Jérôme.
Eastern Townships Paving & Contr. Co., Ltd.	Box 234, Sherbrooke	Lennoxville.
Fréchette, Mathias	St. Emile	St. Emile.
Galipeau, François	Mont St. Grégoire	Mont St. Grégoire.
Gauthier & Tremblay	164 rue Racine, Chicoutimi	Rivière du Moulin.
Gorman, Hubert E.	Buckingham	Buckingham.
Gosselin, Mme. F. X.	Box "U," Chicoutimi	Chicoutimi.
Goulet, Edmond	Stratford Centre	Stratford Centre.
Goyer, Edouard	St. Bruno	St. Bruno.
Goyette, Ovil	Mont St. Grégoire	Mont St. Grégoire.
Granby, City of	Granby	Granby.
Grandmaitre, D.	Eastview, Ont.	Hull.
Guay, J. L., & Frère Ltée	37 Notre-Dame West, Montreal	St. Bruno.
Harvey, Adjutor	St. Joseph d'Alma	St. Joseph d'Alma.
Houle, Fernand	St. Rémi	St. Rémi.
Jacques, Joseph	St. Joseph de Beauce	St. Joseph de Beauce.
Kenny, Wm.	Gaspé	Gaspé.
Lacasse, Josphat	Brownsburg	Brownsburg.
Lafortune, Emelien	Box 284, Joliette	Joliette.
Lagacé, Armand	Beauport	Beauport.
Langlois, Georges	R.R. 1, Montmagny	Montmagny.
Latulippe, E.	St. Louis de Pintendre	St. Louis de Pintendre.
Lauzon, Josaphat	R.R. 1, Terrebonne	Terrebonne.
Lavallée, Michel	Contrecoeur	Contrecoeur.
Laverdière, Albert	Beaurivage	Beaurivage.
Lebeau, Adélar	St. Dominique	St. Dominique.
Lemay, René	St. Jérôme	St. Jérôme.
Levesque, Gonzague & Trefflé	12 rue Bergeron, Kenogami	Kenogami.
Loranger, Pierre	Cap de la Madeleine	Cap de la Madeleine.
Magog, City of	Magog	Magog.
Marchand, Euclide	Carbonneau	Carbonneau.
Marois, Lucien	St. Agapit	St. Agapit.
Mercure, C.	9 St. Denis St., St. Hyacinthe	St. Dominique.
Monette, Olivier	Brownsburg	Brownsburg.
Moody, I. H.	Terrebonne	Terrebonne.
Newton, Wellington	Buckingham	Buckingham.
Pères Trappistes, Les	Village des Pères	Lac St. Jean.
Poirier, Alphonse	St. Polycarpe	St. Polycarpe.
Quebec, City of	Quebec	Ste. Thérèse de Beauport.
Quebec Department of Highways	Quebec	Various.
Raymond, McDonell & Co., Ltd.	660 St. Catherine St. W., Montreal	Ste. Julienne, St. Roch, L'Assomption.
Roulier, Arsène	L'Acadie	L'Acadie.
Shawinigan Engineering Co., Ltd.	Box 2670, Montreal	Windigo, Rapide Blanc.
Sherbrooke, City of	Sherbrooke	Sherbrooke.
Société d'Entreprises Générales, Ltée	Box 363, Lac Mégantic	Armstrong.
Standard Lime Co., Ltd.	Joliette	St. Emélie.
Standard Sand & Gravel, Ltd.	St. Félix de Valois	St. Félix de Valois.
Tétreault, Emile	Mont St. Grégoire	Mont St. Grégoire.
Thibault, Donat	Howick	Howick.
Thouin, Josaphat	Mascouche	Mascouche.
Tremblay, Joseph	376 Georges, St., Shawinigan	Shawinigan.
Vanier, Mme. Arthur	Ste. Thérèse de Blainville	Ste. Thérèse de Blainville.
Venne, Oscar	Lachenaie	Lachenaie.
ONTARIO—		
Barnes, Wm. R., Co., Ltd.	243 Cumberland Ave., Hamilton	Brantford, Copetown, Spring- vale, Waterdown, Hamil- ton and Nixon.
Bellyou, N. E.	R.R. 4, Trenton	Trenton.
Birtch, Jas. A.	R.R. 2, Richmond	Richmond.
Braas Bros.	R.R. 3, Niagara Falls	Niagara Falls.
Brantford, City of	Brantford	Brantford.
Canadian Aggregates, Ltd.	78 Wyandotte St., Walkerville	Walkerville.
Carroll Bros.	490 Ellicott Square, Buffalo, N.Y., U.S.A.	Sherkston.
Consolidated Sand & Gravel, Ltd.	402 Harbour Bldg., Toronto	Durham, Fuller, Paris, Waterford.
Campbellford, Corporation of	Ferris Block, Campbellford	Campbellford.
Cudmore, Mrs. Alice	R.R. 1, Hensall	Hensall.
Dominion Concrete Co., Ltd.	Box 103, Kemptville	Oxford Tp. and Augusta Tp.
Farris, Chas. S.	R. R. 1, Glencoe	Near Glencoe.
File, Secord	43 Port St., Brantford	Brantford.
Foster, R. R.	86 Spadina Ave., Ottawa	Near Ottawa.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Continued

Name	Head office address	Location
ONTARIO—Concluded		
Frid Bros., Ltd.	Main West and Macklin Sts., Hamilton	Hamilton.
Grace Builders' Supplies	291 South Christina St., Sarnia	Near Sarnia.
Hadley's, Chatham, Ltd.	47 Wellington St. W., Chatham	River Thames.
Halpenny, Lewis E.	R. R. 4, Arthur	Near Arthur.
Hinde Bros.	134 Northland Ave., Mount Dennis	Mount Dennis.
Howard Sand & Gravel Co., Ltd.	Aldershot	Aldershot.
Hydro Electric Power Commission of Ontario	620 University Ave., Toronto	Lake St. Joseph.
Jupp, A. E., Const. Co., Ltd.	170 Berkeley St., Toronto	Whitby Tp.
Kingston Sand & Gravel Co., Ltd.	Villa St. Clair Apts., Kingston	Near Kingston.
Lovelace, E. J.	St. Catharines	Near St. Catharines.
Lowe, G. G.	R. R. 1, Leonard	Near Leonard.
McLean, A. B., & Sons	Sault Ste. Marie	Lake Superior.
Nevill, Thos. & Son	R. R. 5, Aylmer West	Aylmer.
Newell, H., & Son	R. R. 4, Aylmer	Malahide Tp.
Northern Development Department	Toronto	Various.
Ontario Department of Highways	Toronto	Various.
Page, Jacob A.	R. R. 3, Fenwick	Near Fenwick.
Peterborough, City of	133 Simcoe St., Peterborough	Peterborough.
Pyke Salvage Co.	506 Princess St., Kingston	Lake Ontario.
Quigley's	317 Main St. E., Hamilton	Bartonville, Waterdwn.
Robinson, Wm. J.	R. R. 1, Crediton	Stephen Tp.
Sarjeant Co., Ltd.	49 Dunlop St., Barrie	Barrie.
Sarnia Cement Products Co.	Sarnia	Sarnia Tp.
Skinner, R.	Exeter	Exeter.
Smythe, C., Ltd.	60 Carlton St., Toronto	Etobicoke Tp.
Spratt, J. H.	Billings Bridge	Billings Bridge.
Stevens, J. H.	Stoney Creek	Stoney Creek, Copetown.
Tees Transit Co.	16 New St., Hamilton	Niagara.
Vallery, F., Estate of	Belwood	Belwood.
Wallaceburg Sand & Gravel Co., Ltd.	Wallaceburg	Pt. Edward.
Wilcox, Horvey	935 Bridge St., Niagara Falls	Stamford Tp.
Woollett Fuel & Supply Co., Ltd.	109 Ottawa St., Walkerville	Gosfield South Tp.
Wright & Co.	960 Queen St., Sault Ste. Marie	Korah Tp.
MANITOBA—		
Brandon, City of	City Hall, Brandon	Brandon.
Building Products & Coal Co., Ltd.	Christie St., Winnipeg	Birds Hill.
Cumming & Dobbie	233-9th St., Brandon	Brandon.
Cusson, J. A.	St. Boniface	Ste. Anne des Chênes.
Greater Winnipeg Water Dist.	Civic Offices, Winnipeg	Mile 31 and Mile 80, G.W., W. D. R.
Manitoba Highways Department	Winnipeg	Various.
McCurdy Supply Co., Ltd.	49 Notre Dame Ave., Winnipeg	Various.
National Parks Branch	Ottawa	Various.
Northwest Gravel & Coal Co., Ltd.	604 Greatwest Permanent Bldg., Winnipeg	Springfield.
Provincial Gravel & Coal Co., Ltd.	704 Greatwest Permanent Bldg., Winnipeg	Springfield.
Riley, W. J.	Molson	Molson.
Rosser, Municipality of	Rosser	Rosser.
SASKATCHEWAN—		
National Parks Branch	Ottawa	Various.
North Battleford, City of	North Battleford	North Battleford.
Saskatchewan Department of Highways	Regina	Various.
ALBERTA—		
Alberta Highways Department	Edmonton	Various.
Cristall Sand	10165-104th St., Edmonton	Perryvale.
Nanton, Town of	Nanton	Nanton.
National Parks Branch	Ottawa, Ont.	Various.
Sutherland, M.	Olds	Westerdale Municipality.
BRITISH COLUMBIA—		
Armstrong, City of	Armstrong	Vernon Mining Division.
Britannia Sand & Gravel Co., Ltd.	1901 West Georgia St., Vancouver	Britannia Beach.
British Columbia Department of Highways	Victoria	Various.
British Columbia Sand & Gravel Co., Ltd.	Suite 19, 136 W. Hastings St., Vancouver	Lynn timer.
Burnaby, Corporation of	Edmonds	Edmonds.
Cascade Rock & Gravel Co., Ltd.	23410 Seymour St., Vancouver	North Vancouver.
Chilliwack, City of	Chilliwack	Chilliwack Tp.
Consolidated Mining & Smelting Company of Canada, Ltd.	Trail	Tadanac.
Deeks Sand & Gravel Co., Ltd.	101 West First Ave., Vancouver	North Vancouver and Port Coquitlam.
Enderby, Corporation of	City Hall, Enderby	Enderby.
Freshwater Sand & Gravel Co., Ltd.	902 Columbia St. W., New Westminster	Port Coquitlam.
Hillside Sand & Gravel Ltd.	1075 Main St., Vancouver	Hillside.
Kamloops, City of	Box 360, Kamloops	Kamloops.
National Parks Branch	Ottawa, Ont.	Various.
Nelson, Corporation of the City of	Nelson	Nelson.
Port Alberni, City of	Port Alberni	Port Alberni.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—Concluded		
Port Coquitlam, City of.....	Port Coquitlam.....	Port Coquitlam.
Prince Rupert.....	Prince Rupert.....	Prince Rupert.
Producers Sand & Gravel Co. (1929), Ltd.....	1902 Store St., Victoria, B.C.....	Equimalt Dist.
Trail, City of.....	Trail.....	Near Trail.
West Kootenay Power & Light Co., Ltd.....	Trail.....	Kootenay Dist.

Stone Quarrying Industry

Granite

NOVA SCOTIA—		
Bower, A. R.....	Box 255, Shelburne.....	Birchtown.
*Rice Bros.....	Lawrencetown.....	Nictaux West.
*Rice, W. D.....	Middleton.....	Nictaux West.
NEW BRUNSWICK—		
*Granite Street Pavement & Construction Co., Ltd.....	Hampstead.....	Hampstead.
Holt & Spinney.....	St. George.....	Nictaux West.
*Milne, Coutts & Co., Ltd.....	St. George.....	St. George.
*Mooney, B., & Son, Realty, Ltd.....	112 Queen St., Saint John.....	Spoon Island.
New Brunswick Department of Highways.....	Fredericton.....	
*O'Brien & Baldwin.....	St. George.....	St. George.
QUEBEC—		
Alcoa Power Co., Ltd.....	P. O. Box 620, Kenogami.....	Racine.
B. & R. Granite Quarry.....	Beebe.....	Stanstead Co.
Barrowman & Denny.....	Box 21, Beebe.....	Beebe.
*Bernier & Sons.....	Box 491, Roberval.....	Roberval.
Bérubé, Lucien, & Sons.....	Brownsburg.....	Chatham Co.
Bourbonnais, J. A.....	Vaudreuil Station.....	Rigaud.
*Brodie's, Ltd.....	1070 Bleury St., Montreal.....	Graniteville, Guenette, Mt. Johnston.
*Bussière, A. L.....	St. Sébastien.....	St. Céclie.
Chicoutimi, City of.....	Chicoutimi.....	Chicoutimi.
*Cloutier Bros.....	Beebe.....	Beebe.
*Delwaide, Anselme.....	Chicoutimi.....	Simard Tp.
Diamond Granite Co.....	Beebe.....	Beebe.
Dontigny, Alphonse.....	Shawinigan Falls.....	Shawinigan Falls.
*Dumas, Arthur, & Co. Eng.....	Rivière a Pierre.....	Bois Tp.
*Dumas, Auguste.....	Rivière a Pierre.....	Bois Tp.
Gingras & Frère, Ltée.....	St. Marc des Carrières.....	Stanhope.
Gosselin, Oscar.....	Lac Mégantic.....	St. Sébastien.
*Granit Noir Canadien Eng.....	St. Joseph d'Alma.....	Signaie Tp., Roberval Tp.
Grenier, E.....	Glenada.....	Glenada.
Guenette Granite Co., Ltd.....	Guenette.....	Campbell Tp.
*Haselton, Wm. M.....	Beebe.....	Stanstead.
Jonquière, Ville de.....	Jonquière.....	Jonquière.
Lacasse & Boulais.....	Box 23, Beebe.....	Beebe.
La Cie Routière Lac St. Jean, Chicoutimi.....	Box 448, Roberval.....	Jonquière.
Lavoie & Doyer Eng.....	Rousseau Mill.....	Portneuf Co.
McIntosh, Robert.....	Beebe.....	Beebe.
National Defence Department.....	Valcartier.....	Valcartier Camp.
*National Granite, Ltd.....	Box 276, Roberval.....	St. Gédéon.
*Nett, Olson, Hokanson & Henrikson.....	Beebe.....	Graniteville.
Pères Trappistes, Les.....	Village des Pères.....	Village des Pères.
Quebec Department of Highways.....	Quebec.....	Various.
Scotstown Granite Co., Ltd.....	Scotstown.....	Scotstown.
Shawinigan Falls, City of.....	Shawinigan Falls.....	Almaville.
*Silver Granite Co., Ltd.....	117 Côte d'Abraham, Quebec.....	St. Samuel Station.
St. Bruno Quarry & Paving Co., Ltd.....	7420 De Larocche St., Montreal.....	St. Bruno.
*Stanstead Granite Quarries Co., Ltd.....	Beebe.....	Graniteville.
*Voyer, F., et Frère.....	Rivière a Pierre.....	Rivière a Pierre.
*Wilkinson, Frank L.....	Beebe.....	Beebe.
ONTARIO—		
Appleby, Thos. A.....	Garden St., Gananoque.....	Leeds Co.
Billie, Chas. V.....	Box 1185, Smiths Falls.....	Lenark Co.
*Building Products, Ltd.....	Box 2529, Montreal, Que.....	Verona.
Fort William, City of.....	Fort William.....	Fort William.
Hall, R. R., Estate.....	Parry Sound.....	Parry Sound.
*Horne, Wm.....	Butler, via Ignace.....	Butler.
Ontario Rock Co., Ltd.....	1501 Canada Permanent Bldg., Toronto.....	Belmont and Methuen Twp.
MANITOBA—		
*Winnitoba Marble Co., Ltd.....	1180 Wall St., Winnipeg.....	Hawk Lake and Darwin.

* Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Stone Quarrying Industry—Concluded

Name	Head office address	Location
Granite—Concluded		
BRITISH COLUMBIA—		
*B. C. Monumental Works, Ltd.	27 Kingsway, Vancouver.	Granite Island.
Canadian National Railways.	C.N.R. Station, Winnipeg, Man.	Copper Creek.
Coast Quarries, Ltd.	1840 Georgia St. W., Vancouver.	Burrard Inlet.
Gilley Bros., Ltd.	902 Columbia St. W., New Westminster.	Coquitlam.
Huecroft, J. F.	Box 54, Cranbrook.	Fort Steel Mining Div.
*Nelson Granite & Monumental Co.	Box 865, Nelson.	Nelson.
*Vancouver Granite Co., Ltd.	1007 Royal Bank Bldg., Vancouver.	Nelson Island.
*Vernon Granite & Marble Co.	Okanagan Landing.	Yale Dist.
*Wilson, James S.	Sirdar.	Sirdar.
Limestone		
NOVA SCOTIA—		
Eastern Lime Co., Ltd.	Windsor.	Windsor.
MacLean & Co.	Oxford.	Nappan.
Mersey Paper Co., Ltd.	Liverpool.	East River.
Nova Scotia Department of Agriculture.	Halifax.	Cape Breton.
Nova Scotia Department of Highways.	Halifax.	Various.
NEW BRUNSWICK—		
Brookville Manufacturing Co., Ltd.	Brookville.	Brookville.
New Brunswick Department of Highways.	Fredericton.	Various.
Randolph & Baker, Ltd.	Randolph.	Randolph.
Saint John Lime Co.	Brookville.	Brookville.
Snowflake Lime, Ltd.	3 Pokiok Rd., Saint John.	Saint John.
QUEBEC—		
Arseneau, Honoré Z.	St. Jean L'Evangeliste.	St. Jean L'Evangeliste.
Baillargeon & Faubert.	62 Union Bldg., St. Lambert.	Caughnawaga.
Beaudet & Bergeron.	St. Antoine de Tilly.	St. Laurent.
*Beaudry, J. Pitre.	Tache St., Joliette.	Joliette.
Boily, Adélard.	Baie St. Paul.	Baie St. Paul.
Boily, Albert.	Baie St. Paul.	Baie St. Paul.
Boivin, Ladislav.	Baie St. Paul.	Baie St. Paul.
Canada Cement Co., Ltd.	Box 290, Station B, Montreal.	Hull.
Canadian Quarries, Ltd.	4740 Iberville St., Montreal.	Montreal.
Canadian Rock Products, Ltd.	2020 Union Ave., Montreal.	South Stukely, St. Timothée.
Cap St. Martin Quarry Reg.	636 Quebec St., Montreal.	Cap St. Martin.
Cercle Agricole de St. Godroy.	St. Godroy.	St. Godroy.
Chenel, Rev. J. E.	Port Daniel.	Port Daniel.
Côté & Gendreau.	St. Pierre, Ile d'Orleans.	Ile d'Orleans.
*Cousineau & Frères.	1261 Van Horne St., Montreal.	Montreal.
Deschamps & Bélanger.	Box 149, Valleyfield.	Nouveau-Salaberry.
*Deschambault Quarry Corp.	52 St. Paul St., Quebec.	St. Marc des Carrières.
Domaine Lime Co.	Lime Ridge.	Lime Ridge.
Drouin, Eva Cimon.	Ste. Justine.	Ste. Justine.
Dufresne Construction Co., Ltd.	1832 Blvd. Pie IX, Montreal.	Rivière des Prairies.
Durocher, Cyrille.	11021 Notre Dame E., Montreal.	Montreal East.
Faubert, Alphonse.	Ville de Lery.	Ville de Lery.
Filion, Adélard.	Lachute.	Lachute.
Fuger & Smith, Ltd.	Pointe Claire.	Pointe Claire.
Gagné, Octave.	St. Ulric.	Matane Co.
Gagnon, Emile.	Jonquière.	Jonquière.
Gaspesian Fertilizer Co.	Port Daniel East.	Port Daniel East.
*Gauthier, Olivier.	St. Marc des Carrières.	St. Marc des Carrières.
*Gauthier, René.	Ville Bélanger.	Laval Co.
*Gingras et Frère Ltée.	St. Marc des Carrières.	St. Marc des Carrières.
Gravel, Edouard Lazare.	Chateau Richer.	Chateau Richer.
Kennedy Construction Co., Ltd.	407 McGill St., Montreal.	Actonvale.
Laberge & Marchand.	Box 63, Chateauguay Bassin.	Chateauguay.
Lacouline, T.	Chateau Richer.	Montmorency Co.
Lagacé, Napoleon.	St. Martin.	St. Martin.
*Lapointe, A. & E.	12034 Lachapelle St., Montreal.	Cartierville.
Lapointe, Emile.	St. Dominique de Bagot.	St. Dominique de Bagot.
Laurentian Stone Co., Ltd.	195 Nicholas St., Ottawa, Ont.	Hull.
Leclerc, J. J.	Rimouski.	Bonaventure Co.
*Lecrenier, Victor.	6858 St. Denis, Montreal.	Cap St. Martin.
Marcl Quarry, Ltd.	St. Michel Station Ste. Clothilde de Chateauguay.	Ste. Clothilde de Chateauguay.
*Martineau & Sons, Ltd.	517 E. Marie-Anne St., Montreal.	Papineau, Pont-Viau.
Matthew Devito Construction, Ltd.	6138 Hamilton St., Montreal.	Pointe Claire.
Miner, R. H., Co., Ltd.	7411 Delansaudière St., Montreal.	St. Laurent.
Montreal Quarry, Ltd.	1340 Bellechasse St., Montreal.	Montreal.
National Quarries, Ltd.	6301 Park Ave., Montreal.	Côte St. Michel.

* Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Limestone—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
Naud, Oscar.....	Lachevrotière.....	St. Marc des Carrières.
*Noël, Oscar.....	44 Wright St., Hull.....	Hull.
*Page, Joseph.....	Charlesbourg West.....	Charlesbourg West.
*Paquette, Lévis & Co.....	Cap St. Marin.....	St. François de Sales.
Quebec Department of Highways.....	Quebec.....	Various.
*Quinlan Cut Stone, Ltd.....	1165 Greene Ave., Montreal.....	St. Vincent de Paul.
Rousseau, T. E.....	48 Second Ave., Quebec.....	Val Brillant.
Schetagne, Wilfrid.....	309 Bord du Lac, Pointe Claire.....	Côte St. Charles.
Shawinigan Chemicals, Ltd.....	Box 2670, Craig St. Station, Montreal.....	Bedford.
St. Barthelemi Quarry.....	St. Barthelemi Village.....	St. Barthelemi.
St. Laurent Quarry, Ltd.....	299 Blvd. Monkland, St. Laurent.....	Bélanger Tp.
St. Louis Quarry (Reg.).....	St. Louis de France.....	Champlain Co.
St. Maurice Quarry, Ltd.....	307 Alexandre St., Three Rivers.....	St. Louis de France.
St. Onge, O. F.....	St. Dominique de Bagot.....	St. Dominique de Bagot.
*St. Vincent de Paul Penitentiary.....	St. Vincent de Paul.....	St. Vincent de Paul.
Standard Lime Co., Ltd.....	Joliette.....	St. Paul de Joliette.
Standard Clay Products, Ltd.....	Box 189, St. Johns.....	St. Johns Co.
*Stone & Quarry, Ltd.....	1340 Bellechasse St., Montreal.....	St. François de Sales.
Theoret, Magloire.....	Box 128, Bellerive, Valleyfield.....	Beauharnois.
Trappist Fathers.....	Village des Pères.....	Lake St. John.
Tremblay, Napoleon.....	31 Joffe Ave., Hull.....	Hull.
Union Quarry, Ltd.....	1340 Bellechasse St., Montreal.....	St. Michel de Laval.
Verreault, E., Ltd.....	194 Bridge St., Quebec.....	Gifford Hull.
Wright Crushed Stone Co., Ltd.....	Hull.....	Hull.
ONTARIO—		
American Cyanamid Co.....	30 Rockefeller Plaza, New York City, U.S.A.....	Oxford Co.
Bourgie, J. B.....	Box 50, Embrun.....	Russell Co.
Brunner, Mond Canada, Ltd.....	Canadian Bank of Commerce Bldg., Toronto.....	Essex Co.
Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, P.Q.....	Belleville.
Canada Crushed Stone Corp., Ltd.....	Sun Life Bldg., Hamilton.....	Hagersville and West Flamboro Tp.
Coldwater Crushed Stone, Ltd.....	Coldwater.....	Coldwater.
Decewville Crushed Stone Co., Ltd.....	52 Elgin St., Hamilton.....	Haldimand Co.
Dibblee Construction Co., Ltd.....	246 Albert St., Ottawa.....	Hawkesbury.
Foster, R. R.....	86 Spadina Ave., Ottawa.....	Ottawa.
Gow, James.....	Fergus.....	Fergus.
Grenon, Joseph.....	Casselman.....	Casselman.
Gypsum, Lime & Alabastine, Canada, Ltd.....	Paris.....	Oxford and Halton Cos.
Hagersville Quarries, Ltd.....	Hagersville.....	Hagersville.
Haldimand Quarries & Construction, Ltd.....	Hagersville.....	Hagersville.
Halliday, Fred.....	Cummings Bridge.....	Cummings Bridge.
Harvey, W. H. & Son, Construction Co., Ltd.....	56 Kensington Ave., Kingston.....	
Henniger, M. G.....	Smiths Falls.....	Leeds Co.
Innerkip Quarries, Ltd.....	Fleet and Bathurst Sts., Toronto.....	Innerkip.
*Irvine, Edgar, Co., Ltd.....	Alexandria.....	Alexandria.
*Kingston Penitentiary.....	Kingston.....	Kingston.
Kirby, F. Sidney, Co., Ltd.....	215 Sussex St., Ottawa.....	Gloucester Tp.
Kirkfield Crushed Stone, Ltd.....	Fleet and Bathurst Sts., Toronto.....	Kirkfield.
Lake St. John Quarry Co., Ltd.....	Longford Mills.....	Longford Mills.
Lally, Mary F.....	Box 39, Smithville.....	Smithville.
Law Construction Co.....	225 Sterling Rd., Toronto.....	Owen Sound and Collingwood.
Limestone Products, Ltd.....	1104 Hermant Bldg., Toronto, 2.....	North Orillia Tp.
MacDonald, A. N.....	Bronte.....	Bronte.
Middleton, J. N.....	Ancaster.....	Ancaster.
Noranda Mines, Ltd.....	804 Royal Bank Bldg., Toronto.....	Haileybury.
Ornamental Stone Products.....	Verona.....	Portland Tp.
Owen Sound, City of.....	Owen Sound.....	Owen Sound.
Pembroke, Town of.....	Pembroke.....	Pembroke.
Pirson, John.....	Stevensville.....	Stamford Tp.
Puslinch Quarry, Ltd.....	Sun Life Bldg. Hamilton.....	Puslinch.
*Queenston Quarries, Ltd.....	Sun Life Bldg., Hamilton.....	St. Davids.
Rayner Construction, Ltd.....	159 Bay St., Toronto.....	Madoc.
Routly Construction Co.....	21 Dundas Square, Toronto.....	Leeds, Ontario and Frontenac Counties.
Walker Bros., Ltd.....	Box 586, Thorold.....	Stamford Tp.
Wehman, John.....	251 Division St., Kingston.....	Kingston.
Welland Ship Canal.....	St. Catharines.....	St. Catharines.
Wilford, F. R., & Co., Ltd.....	Box 119, Lindsay.....	Bobcaygeon.
Windmill Point Crushed Stone Co., Ltd.....	225 Sterling Rd., Toronto.....	Ridgeway.
NOTE.—In addition to the above, counties,		townships and the Department of Highways reported production.
MANITOBA—		
*Gillis Quarries, Ltd.....	Richard and Spruce Sts., Winnipeg.....	Garson.
*Tyndall Quarry Co., Ltd.....	1591 Erin St., Winnipeg.....	Garson.
*Western Stone Co., Ltd.....	205 Confederation Life Bldg., Winnipeg.....	Garson.
Winnipeg, City of.....	Winnipeg.....	Stony Mountain.
Winnipeg Supply & Fuel Co., Ltd.....	812 Boyd Bldg., Winnipeg.....	Spearhill.

* Firms operating dressing works in conjunction with quarry.

DOMINION BUREAU OF STATISTICS

DIRECTORY OF FIRMS—Concluded

Limestone—Concluded

Name	Head office address	Location
ALBERTA—		
Loder's Lime Co., Ltd.....	Kananaskis.....	Kananaskis.
Summit Lime Works.....	Box 273, Lethbridge.....	S. half of Sec. 7, Tp. 8, Rge. 5, W. 5th.
BRITISH COLUMBIA—		
British Columbia Department of Highways.....	Victoria.....	Various.
Beale, F. J., Lime Stone Quarries.....	Van Anda.....	Van Anda.
Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Ymir.
Deeks Sand & Gravel Co., Ltd.....	101-1st Ave. W., Vancouver.....	North Vancouver and Coquitlam.
Pacific Lime Co., Ltd.....	744 West Hastings St., Vancouver.....	Texada Island.
Priore & Vannucchi.....	Fife.....	Fife.
Trail, City of.....	Trail.....	Trail.
Walleen, J. J.....	Port Alice.....	Quatsino Sound.

Marble

QUEBEC—		
Canada Marble & Lime Co.....	4095 St. Catherine St., Montreal.....	Labelle Co.
*Wallace Sandstone Quarries, Ltd.....	1135 Beaver Hall Hill, Montreal.....	Missisquoi Co.
White Grit Co.....	Hurdman Rd., Ottawa, Ont.....	Portage du Fort.
ONTARIO—		
Bolender Bros.....	Haliburton.....	Haliburton.
Bonter Marble & Calcium Co., Ltd.....	Box 61, Marmora.....	Marmora.
Lake St. John Quarry Co., Ltd.....	Longford Mills.....	Longford Mills.
Silvertone Black Marble Quarries.....	53 Queen St., Ottawa.....	St. Albert.
BRITISH COLUMBIA—		
Canadian Marble & Granite Works, Ltd.....	10702-101st St., Edmonton, Alta.....	Marblehead.

Sandstone

NOVA SCOTIA—		
Fairview Crushed Stone Co., Ltd.....	609 Gottingen St., Halifax.....	Halifax Co.
Wallace Sandstone Quarries, Ltd.....	1135 Beaver Hall Hill, Montreal, P.Q.....	Wallace.
NEW BRUNSWICK—		
*Read Stone Co., Ltd.....	Box 549, Sackville.....	Woodpoint and Beaumont.
*Smith, E. A.....	Shediac.....	Shediac.
QUEBEC—		
Beauharnois Light, Heat & Power Co.....	Power Bldg., Montreal.....	Beauharnois.
Blais, Jos., Reg.....	10 Mont Marie Ave., Lévis.....	Lévis Co.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	Lauzon.
Gagnon, L. P.....	St. David, Lévis.....	St. David.
Montpetit, Euclide.....	Melocheville.....	Melocheville.
Quebec Department of Highways.....	Quebec.....	Various.
Rousseau, T. E.....	48 Second St., Quebec.....	Bonaventure and Matane Co's.
Sherbrooke, City of.....	Sherbrooke.....	Sherbrooke.
Vézina, Jos., Reg.....	Ste. Foy, Quebec.....	Ste. Foy.
ONTARIO—		
Campbell Sandstone Quarries, Ltd.....	143-163 Main St., Westboro.....	Carleton Co.
Corners, Austin.....	Terra Cotta.....	Peel Co.
Eves, C., Stone Quarries.....	Terra Cotta.....	Peel Co.
Logan, Harry.....	Box 400, Georgetown.....	Georgetown.
McAlpine Bros.....	Milton.....	Halton Co.
Norrie & McHarg.....	R. R. 4, Acton.....	R. R. 4, Acton.
Norton, A. W., Stone Quarries.....	Limehouse.....	Glen Williams.
Presswood & Gibbs.....	Box 146, Glen Williams.....	Halton Co.
Sykes, Thos.....	Georgetown.....	Halton Co.
Terra Cotta Quarries.....	Terra Cotta.....	Halton Co.

Slate

QUEBEC—		
Broughton Soapstone & Quarry Co., Ltd.....	Broughton Station.....	Ste. Hénédine.
ONTARIO—		
Canadian Slate Mines, Ltd.....	Madoc.....	Madoc.
BRITISH COLUMBIA—		
Kennedy, J. J.....	Sooke Lake.....	Victoria Mining Div.

* Firms operating dressing works in conjunction with quarry.

INDEX

A

PAGE

Abrasives, artificial.....	178
Abrasives, natural (including data on corundum, diatomite, garnets, grindstones, grinding pebbles, pulpstones, sharpening stones and volcanic dust).....	173
Capital.....	20, 176
Employment.....	20, 176
Exports.....	179
Fuel and electricity.....	20, 30
Imports.....	179
Number of firms.....	20
Power employed.....	37
Principal statistics.....	20
Production.....	176
Value of shipments.....	176
Wage-earners.....	26, 176
Accidents.....	37
Actinolite.....	211
Production.....	211
Alberta—	
Capital.....	20
Employment.....	20
Fuel and electricity.....	20, 34
Number of plants.....	20
Power employed.....	36
Principal statistics.....	20
Production.....	8, 17
Wage-earners.....	26
Aldermac mine.....	65, 225
Algoma Steel Corporation.....	228
Alluvial Gold Mining Industry.....	52
Capital.....	18, 54
Employment.....	18, 26, 54
Fuel and electricity.....	18, 30, 54
Number of plants.....	18, 54
Power employed.....	36
Principal statistics.....	18
Report of Comptroller of Yukon.....	53
Value of shipments.....	54
Wage-earners.....	26
Alumina.....	113
Aluminium.....	113, 143
Exports.....	114
Imports.....	114
World production.....	115
World production of bauxite.....	115
Aluminium Company of Canada.....	113, 143
Anhydrite.....	191
Anthracite.....	154
Antimony.....	116
Imports.....	116
Prices.....	13
Production.....	116
World production.....	116
Anyx section.....	67
Apatite.....	221
Arntfield.....	56
Arsenic.....	78
Exports.....	79
Imports.....	79
Method of computing value.....	264
Prices.....	13
Production.....	79
World production.....	79
Artificial gas.....	159
Artware.....	244
Arvida plant.....	113
Asbestos.....	179
Capital.....	20, 182
Employment.....	20, 183
Exports.....	184
Fuel and electricity.....	20, 30
Imports.....	184
Number of mines.....	20
Power employed.....	37
Principal statistics.....	20
Production.....	183
Shipments.....	183
USES.....	182
Wage-earners.....	26, 183
World production.....	185
Ashley mine.....	45
Asphalt (see Bituminous Sands).....	172
Athabaska district.....	60
Atlin District.....	61

PAGE

Auriferous quartz mining industry.....	54
Capital.....	19, 64
Employment.....	19, 64
Fuel and electricity.....	19, 30
Number of plants.....	19
Ores, concentrates and slags shipped.....	63
Ores mined, milled and crude bullion produced.....	63
Power employed.....	36
Principal statistics.....	19
Wage-earners.....	26, 65

B

Ball clay.....	236
Bank of Canada.....	43, 82
Barytes.....	212
Consumption.....	213
Imports.....	212
Production.....	212
Base Metals Mining Corporation.....	75
Bauxite.....	113
Beattie mine.....	45, 56
Bentonite.....	238
Beryllium.....	117
Bidgood mine.....	45
Big Missouri mine.....	61
Bismuth.....	117
Method of computing value.....	264
World production.....	118
Bituminous sands.....	213
Imports of asphalt.....	167
Production.....	214
Black Donald Graphite Co., Ltd.....	215
Blister copper.....	44
Bog iron ore.....	196
Bonanza mine.....	67
Bralorne mine.....	46, 61
Brass.....	93
Brick, building.....	239
Production.....	239
Brick, paving.....	240
Brick and tile.....	240
Bridge river area.....	62
Britannia Mining and Smelting Co., Ltd.....	67, 225
British Columbia—	
Capital.....	25
Employment.....	25, 26
Fuel and electricity.....	25, 34
Number of plants.....	25
Power employed.....	36
Principal statistics.....	25
Production.....	8, 17
Wage-earners.....	26
British Columbia nickel mines.....	99
Brunner, Mond Canada, Ltd.....	202
Buffalo Ankerite mine.....	45
Bussière mine.....	45, 56

C

Cadmium.....	8, 119
Calcium.....	119
Canada—	
Accidents.....	37
Bank of.....	43
Capital.....	25
Employment.....	25, 26
Exports (see individual minerals).....	7
Foreign trade.....	25, 30, 34
Fuel and electricity.....	25, 30, 34
Imports (see individual minerals).....	8
Mineral production values.....	25
Number of operating mines.....	14
Percentage of production by provinces.....	36
Power employed.....	13
Prices, metal.....	18
Principal statistics.....	8
Production.....	26
Wage-earners.....	144
Canadian Copper Refiners, Ltd.....	192
Canadian Gypsum Co., Ltd.....	202
Canadian Industries, Ltd.....	56
Canadian Malartic mine.....	

INDEX—Continued

	PAGE		PAGE
Capital employed (also under individual industries).....	19	Consumption of supplies.....	38
Cariboo District.....	61	Copper.....	102
Cassiterite (see Tin).....	137	Consumption.....	105
Caustic soda.....	202	Exports.....	105
Cement.....	232	Imports.....	105
Capital.....	22, 233	Method of computing value.....	264
Consumption.....	234	Ore reserves.....	101
Employment.....	22, 233	Prices.....	101
Exports.....	234	Production.....	8, 83, 103
Fuel and electricity.....	22, 30	Smelter and refinery capacities.....	149
Imports.....	234	World production.....	107
Power employed.....	37	Copper-gold-silver mining industry.....	65
Principal statistics.....	22	Capital.....	19, 67
Production.....	234	Employment.....	19, 26, 68
Sales.....	234	Fuel and electricity.....	19, 30
Wage-earners.....	27, 233	Number of plants.....	19
Cement Products Industry.....	235	Ore mined and milled.....	69
Central Manitoba mine.....	45, 60	Power employed.....	36
Central Patricia mine.....	45, 67	Principal statistics.....	19
China clay.....	244	Shipments.....	68
Chromite.....	120	Wage-earners.....	26, 68
Imports.....	120	Copper Cliff.....	97, 144, 145, 225
Production.....	8, 120	Copper sulphate.....	104
World production of chrome ore.....	121	Corundum.....	173
Cinnabar (see Mercury).....	132	Creighton mine.....	97
Clay and Clay Products, including data for fire-clay, fireclay blocks and shapes, brick made by different processes, structural tile, drain tile, sewer pipe and pottery.....	236	Crushed stone.....	260
Capital.....	22, 237	Cryolite.....	113, 115
Employment.....	22, 237	Curbstone.....	260
Exports.....	243		
Fuel and electricity.....	22, 30	D	
Imports.....	243	Deloro Smelting and Refining Co.....	78, 88, 145
Number of plants.....	22	Diatomite.....	173, 177
Power employed.....	37	Dome mine.....	45, 57
Principal statistics.....	22	Dominion Salt Co.....	202
Production.....	238	Dominion Steel and Coal Co.....	228
Production from imported clays.....	244	Drain tile.....	241
Wage-earners.....	27, 238		
Clay products and other structural materials, including cement, clay and clay products, lime, sand and gravel, sand-lime brick, slate and stone.....	231	E	
Consumption.....	232	Echo Bay.....	76
Exports.....	232	Eldorado gold mines.....	75, 145
General review.....	231	Electricity (see fuel and electricity).....	30
Imports.....	232	Emery.....	173
Production (see also cement, clay and clay products, lime, sand and gravel, sand-lime brick, slate and stone).....	231	Employment (also see under individual industries).....	19, 26
Coal mining.....	150	Epsom salts.....	219
Capital.....	20, 151	Eustis mine.....	65, 225
Consumption.....	156, 157	Exchange table for Canadian and Foreign Currency.....	13
Disposition.....	153, 154		
Employment.....	20, 152	F	
Exports.....	156	Falconbridge Nickel Mines, Ltd.....	97, 103, 145
Fuel and electricity.....	20, 30	Feldspar.....	185
Imports.....	154, 155	Feldspar and quartz mining industry.....	185
Number of firms.....	20	Capital.....	21, 186
Power employed.....	36	Employment.....	21, 26, 187
Principal statistics.....	20	Exports.....	187
Production.....	152, 153	Fuel and electricity.....	21, 30
Shipments.....	154	Imports.....	187
Wage-earners.....	26, 152	Number of mines.....	21
World production.....	158	Power employed.....	37
Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries in Canada.....	150	Principal statistics.....	21
Cobalt (See silver-cobalt mining industry).....	80	Production.....	187
Method of computing value.....	264	Wage-earners.....	26, 187
Exports.....	80	World production.....	188
Prices.....	13	Ferro-alloys.....	124, 127
Production.....	80	Ferrochrome.....	120
World production.....	81	Ferromanganese.....	127
Cobalt District.....	80	Ferrosilicon.....	127
Coke and artificial gas industry.....	159	Firebrick.....	242
Exports.....	160	Production, from domestic clays.....	242
Imports.....	160	Fireclay.....	242
Materials used.....	160	Production.....	242
Principal statistics.....	160	Fireclay blocks and shapes.....	242
Production.....	160	Flin Flon mine.....	66, 92, 146
Columbium.....	137	Flint (see quartz).....	
Conistum plant.....	45	Floor tile.....	240
Coniaurum mine.....	145	Fluorspar.....	214
Consolidated Copper and Sulphur Co., Ltd.....	65, 225	Fort McMurray District.....	213
Consolidated Mining and Smelting Company of Canada, Ltd.....	67, 74, 76, 88, 92, 146, 225	Frood mine.....	97
Construction.....	231	Fuels (See coal mining, coke, natural gas, peat, and petroleum industries).....	150
		Fuel and electricity (also under individual industries).....	34
		Fuel oil.....	172
		Fullers earth.....	242

INDEX—Continued

G

	PAGE
Garnets.....	174
Gasoline.....	171
General statistics.....	18
Glauber's salts.....	229
Goderich Salt Co.....	202
Gold.....	8
Alberta.....	44, 47, 53
British Columbia.....	44, 47, 53, 60
Canada.....	44
Exports.....	50
Imports.....	50
Legislation.....	41
Manitoba.....	44, 47, 60
Method of computing value.....	264
Monthly prices.....	50
Nova Scotia.....	44, 47, 55
Ontario.....	44, 47, 48, 57
Production.....	44
Quebec.....	44, 47, 53, 55
Receipts at the Royal Mint.....	41, 42
Reserves.....	43, 51
Saskatchewan.....	44, 47, 60
Standard.....	41
Sources.....	40, 49
Taxation.....	41
World production.....	48, 49
Yukon.....	44, 47, 53, 62
Gold Mining Industry.....	19, 40
Alluvial gold mining.....	18, 26, 30, 52
Auriferous quartz mining.....	19, 26, 30, 63
Copper-gold-silver mining.....	19, 26, 30
Gowganda.....	70
Granada gold mine.....	45
Granby Consolidated Mining, Smelting and Power Co.....	61, 67, 147
Granite.....	257
Production.....	215
Graphite, natural.....	216
Consumption.....	216
Exports.....	216
Imports.....	216
Production.....	216
World production.....	217
Great Bear Lake.....	70, 75, 145
Great Slave Lake.....	62
Green Stabell.....	45, 56
Grinding pebbles.....	175
Grindstones.....	175, 177
Production.....	177
Gypsum.....	190
Capital.....	21, 192
Consumption.....	194, 235
Employment.....	21, 26, 193
Exports.....	194
Fuel and electricity.....	21, 30
Number of mines.....	21
Power employed.....	37
Principal statistics.....	21
Production.....	193
Wage-earners.....	26, 193
World production.....	196
Gypsum Products Industry.....	194

H

Hematite.....	122
Hidden Creek mine.....	67
Holbrook Dredging Co.....	54
Hollinger mine.....	45, 57
Horne mine.....	65, 144
Howey mine.....	45, 59
Hudson Bay Mining and Smelting Co.....	66, 74, 92, 146
Hydromagnesite.....	217

I

Ilmenite.....	139
Imported clay products industry.....	244
Imports and exports (see under various items).....	
International Nickel Co. of Canada, Ltd.....	97, 108, 144, 225
Iridium.....	109
Iron ore.....	121
Exports.....	122
Imports.....	122
Shipments.....	122
World production.....	123
Iron oxides.....	196
Capital.....	21, 197

Iron oxides—Con.

Consumption.....	198
Employment.....	21, 197
Exports.....	197
Fuel and electricity.....	21, 30
Imports.....	197
Number of mines.....	21
Power employed.....	37
Principal statistics.....	21
Production.....	9
Wage-earners.....	26
Iron and Steel.....	123
Island Lake area.....	60

K

Kaolin.....	242
Keno Hill.....	71
Kerosene.....	171
Kirkland Lake area.....	40
Klondike river district.....	40, 53

L

Lake Shore mine.....	45, 58
Lamaque mine.....	55
Lead (see silver-lead-zinc mining).....	88
Consumption.....	89
Exports.....	90
Imports.....	90
Method of computing value.....	264
Prices.....	90
Production.....	8, 83, 88
Refined lead produced in Canada.....	89
World production.....	91
Lepidolite.....	130
Lime.....	245
Capital.....	23, 246
Consumption.....	248
Employment.....	23, 27, 246
Exports.....	248
Fuel and electricity.....	23, 30
Imports.....	248
Power employed.....	37
Principal statistics.....	23
Production.....	247
Wage-earners.....	27, 246
Limestone.....	257
Production.....	257
Used in cement.....	235
List of publications..... (inside front and back covers)	
Lithium minerals.....	129
Little Long Lac mine.....	45, 57, 59
Lubricating oil.....	171

M

Macassa mine.....	45
Mackenzie district.....	74
Magnesite.....	217
Exports.....	218
Imports.....	218
Production.....	218
World production.....	218
Magnesium.....	130
Magnesium sulphate.....	219
Magnetite.....	122
Malagash mine.....	202
Manganese.....	131
Production.....	131
World production.....	132
Manganese bog.....	219
Manitoba—	
Capital.....	24
Employment.....	24
Fuel and electricity.....	24, 34
Number of plants.....	24
Power employed.....	36
Principal statistics.....	24
Production.....	8, 16
Wage-earners.....	26
Manufactures based chiefly on minerals (list of publications)..... (inside back cover)	
Marble.....	258
Marl.....	258
Matachewan Cons. mine.....	45, 57
Mattagami clay.....	236
Mayo district.....	71
McIntyre mine.....	45, 58

INDEX—Continued

	PAGE
McWatters gold mine.....	45, 56
Mercury.....	132
Imports.....	133
World production.....	133
Metal mining industry.....	11
Metal prices.....	13
Metals—General review.....	5
Methods of computing values (Appendix 1).....	264
Mica.....	198
Capital.....	21, 199
Consumption.....	201
Employment.....	21, 26, 199
Exports.....	200
Fuel and electricity.....	21, 30
Imports.....	200
Number of mines.....	21
Power employed.....	37
Principal statistics.....	21
Production.....	199
Wage-earners.....	26
World production.....	201
Miller-Lake O'Brien mine.....	72
Mineral industry—	
General review.....	5
List of publications.....	(inside front cover)
Mineral waters.....	219
Mint-Royal Canadian.....	41, 42
Minto mine.....	62
Miscellaneous metal mining, including data on exports, imports, prices, production, also world production of antimony, aluminium, beryllium, bismuth, cadmium, chromite, iron and titanium ore, magnesium, manganese, mercury, molybdenum, pig iron, selenium, steel and rolled products, tantalum, tellurium, tin, tungsten, uranium minerals, vanadium.....	112
Capital.....	19
Employment.....	19, 26, 112
Fuel and electricity.....	19, 30
Number of plants.....	19
Power employed.....	36
Principal statistics.....	19
Values of shipments.....	19
Wage-earners.....	26, 112
Miscellaneous Non-Metals, including actinolite, barytes, bituminous sands, fluorspar, graphite, lithium minerals, magnesite, manganese, sulphate, mineral waters, natro-alunite, phosphate, pyrites, sulphuric acid, silica brick, sodium carbonate, sodium sulphate.....	210
Capital.....	21, 210
Employment.....	21, 26, 210
Fuel and electricity.....	21, 30
Number of firms.....	21
Power employed.....	37
Principal statistics.....	21
Wage-earners.....	26, 211
Moffat Hall mine.....	45
Molybdenite.....	133
Production.....	134
World production.....	134
Monarch mine.....	71, 74
Mond Nickel Co.....	97
Monetary stocks.....	51
Monumental and ornamental stone.....	262
Muscovite.....	198
N	
Natro-alunite.....	223
Natural gas.....	161
Capital.....	20, 164
Employment.....	20, 26, 164
Fuel and electricity.....	20, 30
Number of wells.....	163
Power employed.....	36
Principal statistics.....	20
Production.....	9, 162
Wage-earners.....	26
Nepheline-syenite.....	186
New Brunswick—	
Capital.....	24
Employment.....	24
Fuel and electricity.....	24, 34
Number of plants.....	24
Power employed.....	36
Principal statistics.....	24
New Brunswick—Con.	
Production.....	8, 15
Wage-earners.....	26
Newfoundland.....	122
Nickel.....	100
Alloys.....	102
Consumption.....	102
Exports.....	101
Imports.....	101
Method of computing value.....	264
Prices.....	13
Production.....	8, 100
World production.....	100
Nickel-copper industry, including tables of exports, imports, prices, production and world output of copper, metals of the platinum group, and nickel.....	96
Capital.....	19, 99
Employment.....	19, 26, 99, 100
Fuel and electricity.....	19, 30
Output from mines and smelters.....	99
Power employed.....	36
Proportion of nickel and copper in Sudbury matte.....	100
Salaries and wages.....	19, 26, 99
Nipissing Mining Co., Ltd.....	72
Non-ferrous smelting and refining industry.....	143
Capital.....	19, 148
Employment.....	19, 26
Fuel and electricity.....	19, 30
Power employed.....	36
Principal statistics.....	19, 148
Production (including ores treated).....	148
Value of shipments.....	148
Non-metal mining industries in Canada (other than fuels) including data relating to operations in the following industries: abrasives, asbestos, feldspar and quartz, gypsum, iron oxides, mica, salt, talc and soapstone; and miscellaneous non-metals, including actinolite, barytes, bituminous sands, fluorspar, graphite, lithium minerals, magnesite, magnesium sulphate, manganese bog, mineral waters, natro-alunite, phosphate, pyrites, silica brick, sodium carbonate and sodium sulphate; also imports and exports of sulphuric acid.....	173
Noranda mines and smelter.....	65, 144
Northwest Territories.....	8, 18, 62, 75
Notes on: Statistics of production.....	2
Methods of computing values (Appendix 1).....	264
Nova Scotia—	
Capital.....	24
Employment.....	24, 26
Fuel and electricity.....	24, 34
Number of plants.....	24
Power employed.....	36
Principal statistics.....	24
Production.....	8, 14
Wage-earners.....	26
O	
O'Brien mine.....	45, 56
Ochre.....	196
Ontario—	
Capital.....	24
Employment.....	24, 26
Fuel and electricity.....	24, 34
Number of plants.....	24
Power employed.....	36
Principal statistics.....	24
Production.....	8, 16
Wage-earners.....	26
Ontario Refining Company.....	136, 137, 145
Operators, number of.....	24
Osmium.....	110
P	
Palladium.....	109
Parkhill mine.....	45
Paymaster mine.....	45
Peat industry.....	164
Per capita values.....	13
Percentage of total value of mineral production, by provinces.....	14

INDEX—Continued

					PAGE
Perron mine.....					45, 56
Petroleum industry.....					165
Capital.....				20,	169
Casing used.....					170
Employment.....			20,	26,	170
Exports.....					167
Fuel and electricity.....			20,	30,	167
Imports.....					167
Number of wells.....					167
Power employed.....					36
Prices.....					165
Principal statistics.....					166
Production.....					26
Wage-earners.....					169
World production.....					170
Petroleum Products industry.....					171
Materials used.....					170
Principal statistics.....					171
Products.....					198
Phlogopite.....					221
Phosphate.....					222
Exports.....					221
Imports.....					221
Production.....					57
Pickle Crow mine.....					123
Pig iron, ferro-alloys, steel and rolled products.....					126
Blast furnaces.....					125
Capital.....					126
Consumption.....					125
Employment.....					127
Materials used.....			126,		125
Number of plants.....					125
Principal statistics.....					125
Production.....			125,	128,	129
World production.....					46, 62
Pioneer mine.....					135, 145
Pitchblende.....			75,		108
Platinum group metals.....					108
Exports.....					110
Imports.....					264
Method of computing value.....					110
Platinum metals consumed in United States and Canada.....					110
Prices.....					13
Production.....					109
World production.....					111
Porcelain insulators.....					245
Porcupine area.....			40,	57,	
Portland Canal division.....			61,	88,	
Potash.....					223
Pottery.....					241
Production from domestic clays.....					259
Poultry grit.....					36
Power employed (also see under individual industries).....					46, 61
Premier mine.....					12, 13, 52
Prices (also see under individual metals).....					18
Principal statistics, by industries.....					2
Production—General note on statistics of.....					Inside front cover
Publications, list of.....					Inside back cover
Manufactures based chiefly on minerals, Inside back cover.....					175, 178
Pulpestones.....					175
Pumicite.....					224
Pyrites.....					226
Exports.....					226
Imports.....					225
Production.....					
Q					
Quartz (also see under Feldspar and Quartz).....					188
Quebec—					
Capital.....					24
Employment.....			24,	26,	
Fuel and electricity.....			24,	34,	
Number of plants.....					36
Power employed.....					24
Principal statistics.....					8, 15
Production.....					26
Wage-earners.....					
R					
Radium.....			76,	135,	145
Red Lake district.....					57
Refractories.....					242
Reno gold mine.....					61

	PAGE
Rhenium.....	137
Rhodium.....	109
Rock wool.....	261
Rockingham ware.....	244
Roofing tile.....	240
Rouyn district.....	65
Royal Mint.....	42
Rubble and riprap.....	259
Ruthenium.....	110
Rutile.....	140
S	
Salaries and wages (also under individual industries).....	26
Salt.....	202
Capital.....	21, 203
Consumption.....	205
Employment.....	21, 26, 204
Exports.....	205
Fuel and electricity.....	21, 30
Imports.....	205
Power employed.....	36
Principal statistics.....	21
Production.....	204
Wage-earners.....	26, 204
World production.....	206
Salt cake.....	229
San Antonio mine.....	45, 60
Sand-lime brick.....	254
Sand and gravel.....	248
Capital.....	23, 250
Employment.....	23, 27, 250
Fuel and electricity.....	23, 30
Imports and Exports.....	251
Power employed.....	37
Principal statistics.....	23
Production.....	12, 251
Wage-earners.....	27, 251
Sandstone.....	257
Production.....	257
Sanitary ware.....	244
Saskatchewan—	
Capital.....	24
Employment.....	24
Fuel and electricity.....	24, 34
Number of plants.....	24
Power employed.....	36
Principal statistics.....	24
Production.....	8, 17
Wage-earners.....	26
Scythestones.....	175
Selenium.....	136
Sewer pipe.....	241
Shawingan Falls.....	113
Sharpening stones.....	178
Sheritt-Gordon mines.....	66
Silex.....	188, 189
Silica brick.....	228
Silica sand.....	188, 190
Silver.....	70, 81
Commercial ratio of silver to gold.....	84
Consumption.....	86
Exports.....	84
Imports.....	84
Legislation.....	81
Method of computing value.....	264
Monetary stocks.....	87
Prices.....	13, 72, 84
Production.....	8, 82
Shipments.....	73, 77
Sources.....	71, 83
World production.....	83
Silver-cobalt mining.....	72
Capital.....	19, 73
Employment.....	19, 26, 73
Fuel and electricity.....	19, 30
Number of plants.....	19
Power employed.....	36
Principal statistics.....	19
Shipments of ores, etc.....	73
Wage-earners.....	26, 73
Silver Islet mine.....	70
Silver-lead-zinc mining.....	74
Capital.....	19, 77
Employment.....	19, 26, 78
Fuel and electricity.....	19, 30
Number of plants.....	30

INDEX—Concluded

[illegible]

LIST OF PUBLICATIONS

PREPARED IN THE

MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

STATISTICS OF MANUFACTURES—based chiefly on minerals.

General reports on the sections of manufactures covered by the Mining, Metallurgical and Chemical Branch are issued as follows:—

Printed Reports—

Iron and Steel and Their Products: Primary Iron and Steel (Pig Iron, Ferro-Alloys, Steel and Rolled Products)—Castings and Forgings—Boilers, Tanks and Engines—Farm Implements—Machinery—Automobiles—Auto Parts—Bicycles—Railway Rolling Stock—Wire and Wire Goods—Sheet Metal Products—Hardware, Cutlery and Tools—Miscellaneous Iron and Steel Products—Bridge Building and Structural Steel.

Manufactures of Non-Ferrous Metals: Aluminium Products—Brass and Copper Products—White Metal Alloys—Jewellery and Silverware—Electrical Apparatus and Supplies—Miscellaneous Non-Ferrous Metal Products—Non-Ferrous Metal Smelting and Refining.

Manufactures of Non-Metallic Minerals: Aerated Waters—Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Stone Dressing—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products (d) Non-Metallic Mineral Products, n.e.s.

Chemicals and Allied Products: Coal Tar Distillation—Acids, Alkalies and Salts—Compressed Gases—Explosives, Ammunition and Fireworks—Fertilizers—Medicinal and Pharmaceutical Preparations—Paints, Pigments and Varnishes—Soaps, Cleaning Preparations and Washing Compounds—Toilet Preparations—Inks—Adhesives—Polishes and Dressings—Wood Distillation—Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Miscellaneous chemical products, n.e.s.

Annual Bulletins.—In addition to the foregoing printed reports, a series of bulletins is issued annually, each of which presents the principal statistics relative to production: (a) in a particular industry, e.g. Automobiles—Petroleum Products, etc., (b) in each of the four main groups of industries (c) On certain commodities, e.g. stoves, sulphuric acid, electric motors, etc. These are published in mimeograph form from time to time during the year as the necessary material becomes available and provide advance information on these industries.

Monthly—

Production of Pig Iron and Steel in Canada.

Coal and Coke Statistics for Canada.

Automobile Statistics for Canada.

Quarterly—

Production and Sales of Radio Receiving Sets.

Production and Imports of Galvanized Sheets.

Factory Sales of Electric Storage Batteries.

SPECIAL REPORTS—

The Fertilizer Trade in Canada (Annual).

Directory of Chemical Industries in Canada as of July 1, 1932.

Consumption of Chemicals in Municipal Waterworks, 1934 and 1935.

Copy Doc
Can
5
6-D-28

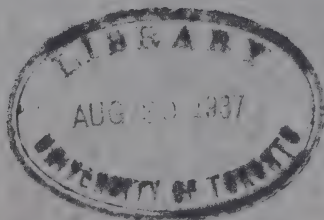
CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
**MINERAL PRODUCTION OF
CANADA**

DURING THE CALENDAR YEAR

1935

Published by Authority of the Hon. W. D. Euler, M.P.,
Minister of Trade and Commerce



OTTAWA
PRINTED BY J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1937

Price, 50 cents

LIST OF PUBLICATIONS

PREPARED IN THE

MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

MINERAL PRODUCTION (Mining and Metallurgy).

General Reports

Preliminary Reports (semi-annual) on the Mineral Production of Canada.

Monthly Reports on Canada's Leading Mineral Products.

Annual Report on the Mineral Production of Canada. (In one volume.)

A comprehensive record of the mining industry embodying historical and world data, detailed information on mineral production, imports and exports for Canada and general statistics relative to the mining industry on capital investment, employment, fuel consumption and power equipment arranged in 9 chapters each dealing with a particular branch of the industry. Statistics on production and trade in mineral products appear in detail in the appropriate chapters. Fully indexed. Chapter titles are: Canada—The Gold Mining Industry—The Silver Mining Industry—The Nickel-Copper Industry—Miscellaneous Metal Mining Industries—The Non-Ferrous Smelting and Refining Industry—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries—Non-Metal Mining Industries (Other than Fuels)—The Clay Products and Other Structural Materials Industries—Notes on the Methods of Computing Values—Index—Directory.

COAL—

Monthly and Quarterly Reports on Coal and Coke Statistics for Canada.

A condensed report on production, imports and exports of coal and coke is issued monthly, publication being made about the twentieth of the next following month.

A more general review is published quarterly, showing statistics for each month, for the quarter, and for the year to date on the output by coal-mining districts and by provinces, imports and exports by ports and by kinds of coal, employment in coal-mining, and tonnage lost. There is also a section on coke showing production, imports, exports, distribution and consumption by months and by provincial groups.

Annual Report on Coal Statistics for Canada.

Text and tables showing for Canada, and for each of the coal-producing provinces, historical and current data on output, tonnage lost, disposition of coal from the mines, domestic and foreign shipments, exports and imports by ports, consumption of coal, prices, employment, salaries and wages paid, power equipment, capital investment, etc.

ANNUAL BULLETINS—

Metals—The Gold Mining Industry in Canada, which includes Alluvial Gold Mining, Auriferous Quartz Mining, Copper-Gold-Silver Mining, and tables showing Canadian and world production of Gold.—The Silver Mining Industry in Canada, which includes Silver-Cobalt-Arsenic Mining, Silver-Lead-Zinc Mining, and tables showing Canadian and world production of Arsenic, Cobalt, Lead, Silver and Zinc.—The Nickel-Copper Mining, Smelting and Refining Industry, which includes Canadian and world production of Nickel.—The Canadian and World Production of Copper.—Metals of the Platinum Group.—The Production of Miscellaneous Metals, including Antimony, Beryl, Bismuth, Cadmium, Chromite, Lithium, Manganese, Mercury, Molybdenite, Radium, Selenium, Tin, Titanium, Tungsten.—The Non-Ferrous Smelting and Refining Industry.

Non-Metals—Abrasives—Asbestos—Coal—Feldspar—Gypsum—Iron Oxides—Mica—Natural Gas—Petroleum—Quartz—Salt—Talc and Soapstone—Miscellaneous Non-Metallic Minerals, including Actinolite, Barytes, Bituminous Sands, Fluorspar, Graphite, Magnesitic dolomite, Bog Manganese, Natural Mineral Waters, Phosphate, Silica Brick, Sodium Carbonate, Sodium Sulphate, Sulphur (Pyrites).

Structural Materials—Cement—Clay and Clay Products—Lime—Sand and Gravel—Stone.

SEE INSIDE BACK COVER FOR PUBLICATIONS ON MANUFACTURES BASED CHIEFLY ON MINERALS

CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
**MINERAL PRODUCTION OF
CANADA**
DURING THE CALENDAR YEAR
1935

Published by Authority of the Hon. W. D. Euler, M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1937

NOTES ON STATISTICS OF PRODUCTION

In the collection of production data, the Dominion Bureau of Statistics makes a division between primary and secondary production. In the first-named class, there are separate sections for the collection of statistics on (a) **Agricultural Products**, (b) **Furs**, (c) **Fish**, (d) **Forest Products**, (e) **Mineral Products**.

In the second are included (a) **Manufacturing** and (b) **Construction**.

Manufacturing is subdivided into nine groups of industries, producing concerns being classified according to the principal component material of their major products. For example, manufactures of leather goods are classified under "Animal Products"; the pulp and paper industry under "Wood and Paper", etc. An outline of the scheme of classification in use for manufacturing industries is given below.

Manufactures of—

- (1) **Vegetable Products**, including—Coffee, and Spices; Cocoa and Chocolate; Preserved and Canned Products; Pickles, Vinegar and Cider; Flour and Cereals; Bread and other Bakery Products; Macaroni and Vermicelli; Distilled and Brewed Liquors and Wines; Rubber Products; Starch and Glucose; Sugar, Tobacco Products; Linseed Oil and Oil Cake.
- (2) **Animal Products**, including—Fish and Fish Products; Dairy Factory Products; Meat and Meat Products; Leather and Leather Products; Furs and Fur Products.
- (3) **Textiles and Textile Products**, including—Cotton Textiles (Cloth, Yarn, Thread and Waste); Woollen Textiles (Cloth, Yarn, Blankets, Felt, and Waste); Silk Products; Factory-Made Clothing; Carpets, Rugs and Mats; Cordage, Rope and Twine.
- (4) **Wood and Paper**, including—Pulp and Paper Mill Products; Paper Goods; Printing, Publishing and Lithographing; Saw and Planing Mill Products; Furniture; Carriages; Wagons and Sleighs; Wooden Containers; Woodenware; Turned Wood Products; and the Output of Similar Wood-Using Industries.
- (5) **Iron and Steel and Their Products**, including—Pig Iron and Ferro-Alloys; Steel and Rolled Products; Castings and Forgings; Boilers, Tanks and Engines; Farm Implements; Machinery; Automobiles; Auto Parts; Bicycles; Railway Rolling Stock; Wire and Wire Goods; Sheet Metal Products; Hardware, Tools and Cutlery; Bridge Building and Structural Steel Work; Miscellaneous Iron and Steel Products.
- (6) **Manufactures of Non-Ferrous Metal Products**, including—Aluminium Products; Brass and Copper Products; White Metal Alloys; Jewellery and Silverware; Electrical Apparatus and Supplies; Non-Ferrous Smelting and Refining; Miscellaneous Non-Ferrous Metal Products.
- (7) **Manufactures of the Non-Metallic Minerals**, including—Aerated Waters—Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Dressed Stone—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Miscellaneous Non-Metallic Mineral Products, n.e.s.
- (8) **Chemicals and Allied Products**, including—Coal Tar Distillation; Acids, Alkalies and Salts—Compressed Gases; Explosives, Ammunition and Fireworks; Fertilizers; Medicinal and Pharmaceutical Preparations; Paints, Pigments and Varnishes; Soaps, Cleaning Preparations and Washing Compounds—Toilet Preparations; Inks; Adhesives; Polishes and Dressings; Hardwood Distillation; Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.
- (9) **Miscellaneous Products**, including—Brooms and Brushes; Electric Light and Power; Musical Instruments, etc.

The statistics of manufactures are also classified according to the **use or purpose** of the end products as follows:—

- (1) **Food**, including—Breadstuffs; Fish; Nuts; Fruits and Vegetables; Meats, Milk Products; Oils and Fats; Sugar; Infusions; Miscellaneous.
- (2) **Drink and Tobacco**, including—Beverages, alcoholic; Beverages, non-alcoholic; Tobacco.
- (3) **Clothing**, including—Boots and Shoes; Fur Goods; Garments and Personal Furnishings; Gloves and Mitts; Hats and Caps; Knitted Goods; Waterproofs; Miscellaneous.
- (4) **Personal Utilities**, including—Jewellery and Time-Pieces; Recreational Supplies; Personal Utilities, n.e.s.
- (5) **House Furnishings**.
- (6) **Books and Stationery**.
- (7) **Vehicles and Vessels**.
- (8) **Producers' Materials**, including—Farm Materials; Manufacturers' Materials; Building Materials; General Materials.
- (9) **Industrial Equipment**, including—Farm Equipment; Manufacturing Equipment; Trading Equipment; Service Equipment; Light, Heat and Power Equipment; General Equipment.
- (10) **Miscellaneous**.

PREFACE

This report on the Mineral Production of Canada is issued in continuance of the series of annual reports published first in 1886 by the Geological Survey of Canada, later by the Mines Branch of the Department of Mines, and since 1921 by the Dominion Bureau of Statistics. It contains final data on the production of Canada's mines, together with details of capital employed in the mining industry, salaries and wages paid, the number of employees, the amount expended on fuel and power and the power-producing equipment installed. The total value of process supplies used by the operators was collected in 1935 for the first time and may be found in tables 33 to 35.

A change has been made in this report in the method of computing the *net value* of shipments from the mines. Prior to 1935, the net selling value of products was the amount received by the shipper. Beginning with 1935, the Bureau started to compute the net value of sales by deducting the cost of fuel, electricity and process supplies from the amount received for products sold; therefore, this figure is not comparable with similar figures in preceding reports nor for years prior to 1935 in this report.

Tables of world production of the more important minerals and metals are included for the purpose of assisting those who may be making international studies and who may not have a reference library readily at hand.

Prior to 1931 it had always been the practice of the Bureau to evaluate gold at the standard price of \$20·671834 per fine ounce regardless of what might be defined as the normal fluctuations of foreign exchange. However, during the past five years, international events of great importance have resulted in a very pronounced increase in the price of gold. This price appears, at the present time, to have attained a temporary stability. For this reason the value of gold in this report, shown either separately or incorporated in the total value of Canadian mineral production, has been computed in Canadian funds. This new statistical procedure in the recording of gold values should be noted in making comparisons with corresponding data published in earlier reports.

In addition to this report the Bureau issues a preliminary report of mineral production about March 15th following the year to which it refers. Since the fuel problem is of major importance to Canada, a separate annual report and quarterly reports on coal statistics are published. Statistical bulletins on the production of Canada's principal minerals are issued monthly, and bulletins on various branches of the mining industry are published as the information becomes available.

As in former years, the Bureau has continued to co-operate with the provinces of Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia in the collection of coal statistics.

By arrangement, the Bureau and the Mines Departments of the provinces of Nova Scotia, Quebec, Ontario, Manitoba and British Columbia use joint forms in the collection of mineral statistics. This system is of considerable advantage to the operator, as he now has to file only one form in duplicate, and it also tends to greater comparability in Dominion and Provincial figures.

The cordial thanks of the Bureau are tendered to mine and smelter operators, to the Department of Mines and Resources, to the Royal Canadian Mint and to the Imperial Institute, London, for assistance given and information made available. The railway and other transportation companies, as well as smelter operators outside of Canada, have also furnished data, the receipt of which is gratefully acknowledged.

This report has been prepared under the direction of Mr. W. H. Losee, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., and Mr. B. R. Hayden, of the mineral division staff.

R. H. COATS,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS,
OTTAWA, April 2, 1936.

TABLE OF CONTENTS

	PAGE
CHAPTER ONE—CANADA—General review.....	5
CHAPTER TWO—The Gold Mining Industry, including (a) The Alluvial Gold Mining Industry, (b) The Auriferous Quartz Mining Industry, and (c) The Copper-Gold-Silver Mining Industry and commodity statistics showing production, imports, exports and world output of <i>Gold</i>	43
CHAPTER THREE—The Silver Mining Industry, including (a) The Silver-Cobalt Mining Industry, (b) The Silver-Lead-Zinc Mining Industry, and commodity statistics, showing production, imports, exports, prices and world output of <i>Arsenic, Cobalt, Silver, Lead, and Zinc</i>	70
CHAPTER FOUR—The Nickel-Copper Mining, Smelting and Refining Industry, including commodity statistics showing production, imports, exports, prices and world production of <i>Nickel, Copper, and Metals of the Platinum Group</i>	95
CHAPTER FIVE—Miscellaneous Metal Mining Industries, including commodity statistics showing production, imports, exports, prices and world production of <i>Aluminium, Antimony, Bauxite, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron, Steel and Rolled Products, Manganese, Mercury, Molybdenum, Radium, Tin, Tungsten, and Vanadium</i>	111
CHAPTER SIX—The Non-Ferrous Smelting and Refining Industry.....	143
CHAPTER SEVEN—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries (Fuels), including commodity statistics showing production, imports, exports, prices and world production of <i>Coal, Coke, Natural Gas, Peat and Crude Petroleum</i> ...	150
CHAPTER EIGHT—Non-Metal Mining Industries (excluding Fuels), including commodity statistics showing production, imports, exports, prices and world output of <i>Abrasives, Asbestos, Feldspar, Gypsum, Iron Oxides, Mica, Quartz, Salt, Talc and Soapstone</i> , and Miscellaneous Non-Metallic Minerals, including: <i>Actinolite, Barytes, Bituminous Sands, Graphite, Fluorspar, Lithium Minerals, Magnesitic dolomite, Magnesium Sulphate, Natural Mineral Waters, Natro-Alunite, Phosphate, Pyrites, Silica Brick, Sodium Carbonate and Sodium Sulphate</i>	175
CHAPTER NINE—The Clay Products and Other Structural Materials Industries, including commodity statistics showing production, imports and exports of <i>Cement, Clay and Clay Products</i> —(a) From Domestic Clays: <i>Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Sanitary Ware and Pottery, Fireclay, Firebrick, Fireclay Blocks and Shapes</i> ; (b) From Imported Clays: <i>Ceramic or Glazed Floor and Wall Tiles, Electrical Porcelain Insulators, Sanitary Ware and Pottery, Fireclay Blocks and Shapes; Lime, Sand and Gravel, Sand-Lime Brick, Slate, and Stone</i>	233
APPENDIX—Explanatory notes on the methods of computing values shown in reports on the mineral production of Canada.....	268
DIRECTORY—List showing the names, head offices and mine or plant addresses of all concerns operating in the mineral industry in Canada, arranged in alphabetical order, by industries and by provinces.....	270
INDEX.....	305

DOMINION BUREAU OF STATISTICS

R. H. COATS, LL.D., F.R.S.C., F.S.S. (Hon.), Dominion Statistician
W. H. LOSEE, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1935

CHAPTER ONE

General Review.—The value of mineral production in Canada during 1935 totalled \$312,344,457, an all-time high record for the Canadian mining industry. The greatest annual production during previous years was that of 1929 when the mineral output of the Dominion amounted to \$310,850,246. Following 1929 pronounced annual decreases were recorded until 1932 in which year the value fell to \$191,228,225, or 38·5 per cent lower than in 1929. Since 1932 a distinct and unbroken advance has been realized.

During 1935 each of the principal mineral-producing divisions of the industry experienced gains. The value of metals and metalliferous ores produced totalled \$221,800,849 or an increase of 14·3 per cent over that of 1934 and the year witnessed record breaking outputs of gold, copper, nickel, palladium, selenium and tellurium. Especially noteworthy in metal mining were the widespread and diversified activities in the gold mining industry; development and exploration programmes were not only intensified in the older and producing areas but were extended into many remote regions hitherto considered as being virtually unexplored wilderness. Nickel output was 7·6 per cent greater than that of the preceding year, reflecting the great expansion experienced throughout the nickel-copper mining and smelting industry of the Sudbury area. The importance of mining, and more especially primary metal production, as a contributor to our national wealth is rapidly increasing. In 1886 Canadian mineral output was evaluated at \$10,221,255 or \$2.23 per capita. In 1925 the value of Canadian mineral production at \$226,583,333 represented \$24.38 per capita, and of this total value metals contributed \$117,082,298 or 51·7 per cent. In 1935 the value of metal output had increased to \$221,800,849 or 71·0 per cent of the total for all minerals produced while the value of the entire mineral output had risen to \$28.56 per capita.

Canada, in addition to attaining a position of world prominence as a producer of gold and most of the major non-ferrous metals, has become, during recent years, a very important source of platinum, palladium, selenium, cadmium, tellurium, radium and various uranium products. Most of these represent by-products recovered in refining operations and are recognized in world markets for their high degree of purity. As a world producer of mineral wealth in 1935 the Dominion ranked first in nickel and asbestos, second in radium, third in gold, silver, copper and zinc, and fourth in lead.

The combined value of coal, natural gas, peat and petroleum produced during 1935 totalled \$54,824,200 as compared with \$54,262,099 in 1934. Coal, in point of value, is the most important fuel produced totalling \$41,963,110 in 1935 and of this output, Nova Scotia contributed \$20,391,227; Alberta, \$14,094,795; British Columbia, \$5,043,510, and the balance by mines operated in Saskatchewan, New Brunswick, Manitoba, and the Yukon. Petroleum output totalled in value \$3,492,188 of which production from wells in Alberta accounted for \$3,102,227 or 88·8 per cent of the total; output in Ontario was evaluated at \$346,156 while much smaller productions were recorded for New Brunswick and Yukon Territory. The greater part of Canada's natural gas production comes from the provinces of Alberta and Ontario with relatively smaller quantities being reported by producers in New Brunswick, Saskatchewan and Manitoba.

Production of non-metallic minerals, other than structural materials or fuels, was featured by a pronounced increase in mine shipments of asbestos; these totalled 210,467 tons valued at \$7,054,614 as compared with 155,980 tons worth \$4,936,326 in 1934. Production of the mineral during both years came from the Eastern Townships of the province of Quebec. It is also worthy of note that considerable development work was conducted during 1935 on an asbestos deposit located in Bannockburn township, Ontario; the fibre was reported as being of high quality and commercial production is being considered. Other non-metallic minerals in this group to realize increases in the value of their shipments included graphite, gypsum, magnesitic-dolomite, and sulphur, and although the value of salt production declined 3·8 per cent from 1934 the tonnage was the greatest in the history of the Canadian salt industry.

A very encouraging uptrend in the production of practically all structural materials was experienced in 1935. The value of these products totalled \$23,215,400 or an increase of 20·4 per cent over 1934. Shipments of domestic clay products alone, and including building brick, tile, sewer pipe, etc., amounted to \$3,012,563 as against \$2,680,410 in 1934; building brick and hollow blocks were manufactured in every province with the exception of Prince Edward Island. Shipments of cement were made from mills in Quebec, Ontario, Manitoba, Alberta, and British Columbia and production for the year totalled 3,648,086 barrels valued at \$5,580,043 as compared with 3,783,226 barrels at \$5,667,946 in the preceding year; this relatively small decrease was the only one occurring in 1935 among the principal structural materials industries. Shipments of sands and gravel for railway ballast and more particularly for concrete and highway construction were largely responsible for a 43 per cent increase over 1934 in the total tonnage of these materials produced. Ontario and Quebec are the largest lime-producing provinces, the tonnage of their shipments being 54·3 per cent and 28·7 per cent, respectively, of the Dominion total in 1935; industries consuming lime as a chemical absorbed 260,885 tons valued at \$1,775,657 in 1935 while a tonnage of 144,534 worth \$1,150,134 was utilized for building and other non-chemical purposes.

Ontario continues to command a leading position as a mineral producing province; of the total value of Canadian mineral production in 1935, Ontario contributed 50·9 per cent; British Columbia, 15·6 per cent; Quebec, 12·5 per cent; Nova Scotia, 7·4 per cent, and Alberta, 7·1 per cent. The other mineral producing provinces in the order of their production were—Manitoba, Saskatchewan, New Brunswick and the Yukon Territory.

Employment in the Canadian mining industry was consistently higher than in 1934, while on the average it was also in greater volume than in any other year on record. The index at 131·1 on December 1, 1935, was 10 per cent higher than at the opening of the year, and was also 6·7 per cent higher than on December 1, 1934. The index averaged 123·3 compared with 110·8 in 1934 and 97·5 in 1933. In coal mining, employment was in practically the same volume on the whole, the index averaging 88·4 compared with 87·6 in 1934. Employment in the extraction of metallic ores was generally much higher than in 1934, or any other year for which statistics are available; the mean index, at 218·8 was nearly 22 per cent above the average of the preceding year. Non-metallic minerals, other than coal, again showed considerably increased employment, being assisted by the partial recovery in the building trades and by activity on road work; employment in every month of 1935 was better than in the same period of the preceding year.

Wholesale price levels continued to make gradual gains during 1935, as indicated by the Bureau's general wholesale price index number which mounted from 71·1 in December, 1934, to 72·6 in December, 1935. The corresponding index for December, 1933, was 69·0. This advance was due largely to the irregular rise in prices for primary products. Substantial gains in nearly all non-ferrous metals were more than sufficient to cancel 1934 losses. Silver, alone, among the commercially important non-ferrous metals, showed decided weakness which developed in December, 1935, when powerful support was withdrawn from the London market. Fuel prices registered fractional declines which were distributed among coal, coke and wood.

Gold stocks remained comparatively inactive for the first four months of the year, and then commenced to lose ground until August. Subsequent recovery was spasmodic and an index for the group was 116·9 in December, materially below the preceding December level of 124·7. Base metals broke away in March from the inertia which characterized all security markets in the early part of the year. The December index was 201·7 as compared with 159·2 in May and 129·6 in December, 1934. A composite price index of mining stocks showed a moderate increase for the year, being 124·9 in December, 1934, and 133·6 in December, 1935.

The total British and foreign investment in Canada at the end of 1935 has been estimated by the Internal Trade Branch of the Dominion Bureau of Statistics at \$6,910 million. Of this amount, about \$390 million was invested in the industries of the Mining, Clay Products and Other Structural Materials group. British capital was represented by \$156 million of the investment in this group of industries, while United States capital accounted for \$230 million and the capital from countries other than Great Britain and the United States was about \$4 million.

Exports of Canadian primary metals and minerals and metals and minerals in the manufactured form showed a substantial increase during the year. Non-ferrous metals and their products, including gold bullion shipped out of Canada during 1935 totalled \$215,979,728, an increase of 8 per cent. Exports of fine gold bullion were not as large as in the preceding year but nickel exports rose in value from \$28,913,230 to \$36,285,482, copper and its products increased 27 per cent to \$29,661,697 and lead and lead products, 33 per cent to \$7,161,424. Exports of silver bullion and zinc were also higher. Among the non-metallic minerals, increases occurred in asbestos, gypsum, coal, coke and other coal products, and clay and clay products. Included among the more important mineral imports in 1935 were petroleum, asphalt and their products valued at \$44,092,526 as compared with \$41,326,516 in 1934. Imports of coal and coke and other coal products amounted to \$37,638,084 in 1935, a decrease of slightly more than 5 per cent from 1934.

A statistical survey to determine the value of consumable stores and equipment purchased and expenditures for freight and insurance, by the Canadian mining and non-ferrous metallurgical industries was recently conducted by the Bureau of Statistics. This survey revealed that the total value of purchases by the industry in 1935, as computed from returns made available, amounted to \$84,813,603. The survey covered the major groups of the mining industry, including metal mining, smelting and refining of non-ferrous ores; non-metallic mineral mining, including coal, petroleum and natural gas production, and, to a lesser extent, the stone, cement, lime and other structural materials industries.

Note to table 20.—The value afore reserves is entirely excluded from capital for the first time in 1935.

Table 1.—Mineral Production of Canada, by Provinces, 1935 ⁽¹⁾

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*	Canada
METALLICS										
Arsenic (As ₂ O ₃)										
lb.				2,558,789						2,558,789
\$				75,326						75,326
Bismuth.....				7,079				6,718		13,797
lb.				6,796				6,449		13,245
\$								441,203		441,203
Cadmium.....										1,144
ton			346	798						14,947
Chromite.....			5,371	9,576						681,419
lb.				681,419						512,705
Cobalt.....				512,705						418,997,700
lb.				252,027,928	38,011,371	11,429,452		38,478,043		32,311,960
Copper.....			79,050,906	19,295,965	2,963,146	890,974		2,999,525		32,311,960
lb.			6,162,350	2,220,336	142,613	14,323		391,633	35,907	3,284,890
Gold.... fine oz.	9,376		470,552	45,898,417	2,948,072	296,083	150	8,095,772	742,263	67,904,700
\$	193,819		9,727,173				3,101			
Estimated exchange equalization on gold produced	136,123		6,831,552	32,235,207	2,070,479	207,943	2,178	5,685,793	521,304	47,690,579
Lead..... lb.			2,047,624	22,532	19,179			336,784,326	231,418	339,105,079
\$			64,156	706	601			10,552,059	7,250	10,624,772
Manganese ore										100
ton		100								800
\$		800								
Nickel..... lb.				138,516,240						138,516,240
\$				35,345,103						35,345,103
Palladium, Rhodium, Iridium, etc.										
fine oz.				84,772						84,772
\$				1,962,937						1,962,937
Platinum. fine oz.				105,335				39		105,374
\$				3,444,455				1,275		3,445,730
Radium and uranium (products)...			data not available for publication							
Selenium..... lb.			206,421	75,363	65,074	19,567				366,425
\$			396,328	144,697	124,942	37,569				703,536

*Includes silver, lead and petroleum produced in the Northwest Territories.

(1) Unless otherwise noted all total values of mineral production from 1931 to 1935, inclusive, include estimated exchange equalization on gold produced.

Table 1.—Mineral Production of Canada, by Provinces, 1935—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*	Canada
METALLICS—Conc.										
Silver... fine oz.	372		668,836	5,161,651	1,206,454	201,608	16	9,178,400	201,221	16,618,558
\$	241		433,338	3,344,229	781,660	130,622	10	5,946,677	130,371	10,767,148
Tellurium... lb.			1,708	14,275	340	102				16,425
\$			3,416	28,550	680	204				32,850
Titanium ore... ton			2,288							2,288
\$			16,400							16,400
Zinc... lb.			5,322,844		51,129,980	8,974,720		255,222,315		320,649,859
\$			164,955		1,584,513	278,126		7,909,314		9,936,908
Total..... \$	330,183	800	23,805,039	142,304,669	10,474,093	1,841,521	5,289	41,638,067	1,401,188	221,800,849
NON-METALLICS FUELS										
Coal... ton	5,822,075	346,024			3,106	921,785	5,462,894	1,331,287		13,888,006
\$	20,391,227	1,129,019			7,408	1,293,668	14,094,795	5,043,510	835	41,963,110
Natural M... cu.ft.		615,454		8,158,825	600	75,558	16,060,349		3,483	24,910,756
Gas... \$		303,886		4,938,084	180	7,555	4,113,436			9,363,141
Peat... ton				1,340						1,340
\$				5,761						5,761
Petroleum... bbl.		12,954		165,041			1,263,510		5,115	1,446,620
crude... \$		18,230		346,156			3,102,227		25,575	3,492,188
Total..... \$	20,391,227	1,451,135		5,290,001	7,588	1,301,223	21,310,458	5,043,510	29,058	54,824,200
OTHER NON-METALLICS										
Actinolite... ton										
\$										
Asbestos... ton			210,467							210,467
\$			7,054,614							7,054,614
Barytes... ton										
\$										
Bituminous... ton										
sands... \$							40			40
Diatomite... ton	666			100			160			160
\$	26,660			4,600				57		823
Feldspar... ton			7,002	8,656	2,084			1,880		33,140
\$			63,075	75,003	6,252					17,742
Fluorspar... ton				75						144,330
\$				900						75
Graphite... ton			21	1,761						900
\$			1,281	78,500						1,782
Grindstones (includes pulpstones, etc.)... ton	50	456								708
\$	2,006	21,175								340
Gypsum... ton	454,703	30,796		88,247	10,500			10,829		34,010
\$	523,216	105,960		164,807	85,885			7,618		541,864
Iron oxides (ochre)... ton			5,357					52,335		932,203
\$			75,388					159		5,516
Magnesian dolomite... \$								1,687		77,075
Magnesium sulphate... ton			486,084							486,084
\$								340		340
Mica... lb.								7,965		7,965
\$										1,255,616
Mineral imp. waters... gal.			74,894	509,826	7,144					82,038
Phosphate... ton			126,616	19,900						146,516
\$			15,113	1,477						16,590
Quartz... ton			116	70						186
\$			1,043	60						1,103
Salt... ton	9,640		51,948	83,034	147			11,056		233,002
\$	13,978		226,839	120,005	220			4,771		424,882
Silica brick... M	38,701			320,003	1,538					360,343
\$	161,659			1,698,508	18,765					1,880,978
\$	1,968			493						2,461
Soapstone... \$	73,218			22,976						96,194
Sodium carbonate... ton			32,053							32,053
\$								242		242
Sodium sulphate... ton								2,430		2,430
\$						44,817				44,817
Sulphur(t)... ton						343,764				343,764
\$								46,784		67,446
Talc... ton			7,370	13,292				453,536		634,235
\$			47,779	132,920				93		13,803
Volcanic dust... ton				13,710				1,318		139,479
\$				138,161						
Total..... \$	800,737	127,135	8,078,163	2,445,061	111,122	404,879	160	536,751		12,504,008

(t) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

* See footnote page 7.

Table 1.—Mineral Production of Canada, by Provinces, 1935—Concluded

—	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*	Canada
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS										
Clay Products										
Brick—										
Soft mud process—										
Face.....M	50		225	5,553	600	51	216			6,695
\$	700		2,025	104,271	8,571	1,248	5,400			122,215
Common..M	450	1,202	1,782	10,026	2,971	163	3,087	1,516		21,197
\$	5,000	20,101	12,570	128,205	42,635	2,143	29,643	19,207		259,504
Stiff mud process (wire cut)—										
Face.....M	735	104	6,909	16,558	192	37	168	586		25,289
\$	17,313	2,777	136,975	321,581	5,001	1,076	1,545	13,798		500,066
Common..M	3,050	333	18,044	9,170		169	646	872		32,334
\$	38,208	4,840	252,014	125,559		1,766	3,311	11,425		437,123
Dry press—										
Face.....M			1,424	5,953		45	838	194		8,454
\$			35,559	119,379		1,093	11,881	7,130		175,042
Common..M				1,563		12	4,806			6,381
\$				22,071		203	32,979			55,253
Fancy or ornamental brick.....M				13						13
\$				728						728
Sewer brick..M				60				115		175
\$				970				4,266		5,236
Paving brick.....M								15		15
\$								627		627
Firebrick.....M						272	51	1,494		1,817
\$						18,114	2,476	69,559		90,149
Fireclay.....ton	1,065					670	14	523		2,272
\$	3,541					4,683	213	7,137		15,574
Kaolin.....ton			170							170
\$			1,520							1,520
Fireclay blocks and shapes..\$	488	1,956				57,055		11,845		71,344
Structural tile—										
Hollow blocks.....ton	3,558	410	11,894	22,983	1,698	1,098	3,900	1,654		47,195
\$	23,914	3,640	87,155	156,702	15,002	9,109	34,493	14,593		344,608
Roofing tile.....No.				82,015						82,015
\$				3,669						3,669
Floor tile (quarries) sq. ft.				48,923			1,567	1,275		51,765
\$				7,142			314	173		7,629
Ceramic tile..\$				615						615
Drain tile...M	729	4	540	5,061	69		52	669		7,124
\$	33,539	160	15,895	125,593	3,546		2,176	24,427		205,336
Sewer pipe, copings, flue linings, etc..\$	146,962		49,449	196,647			63,600	24,901		481,559
Pottery, glazed or unglazed..\$		28,555		50,000			138,648	3,508		220,711
Bentonite.....ton								41		41
\$								781		781
Other clay products.....\$	813	449		7,093		1,660		3,259		13,274
Total.....\$	270,478	62,478	593,162	1,370,225	74,755	98,150	326,679	216,636		3,012,563
OTHER STRUCTURAL MATERIALS†										
Cement.....bbl.			1,751,012	1,243,836	266,457		219,555	167,226		3,648,086
\$			2,472,008	1,752,148	604,857		436,914	314,116		5,580,043
Lime†.....ton	11,331	16,272	116,473	220,140	18,615		6,584	16,004		405,419
\$	82,698	124,775	678,866	1,696,867	185,517		57,108	99,960		2,925,791
Sand and gravel.....ton	1,423,557	1,813,206	5,268,987	8,770,117	1,399,659	502,732	653,511	1,381,720		21,213,489
\$	685,973	845,981	1,442,468	2,211,406	404,730	171,170	146,092	481,620		6,389,440
Slate.....ton			819					310		1,129
\$			1,229					3,100		4,329
Stone.....ton	212,465	85,144	1,390,517	2,122,941	146,014		2,242	356,895		4,316,818
\$	621,832	208,723	2,053,761	1,865,892	189,755		6,981	358,290		5,303,234
Total.....\$	1,390,503	1,179,479	6,648,332	7,524,313	1,384,859	171,170	647,095	1,257,086		20,202,837
Grand Total (in Canadian Funds).....\$	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417	3,816,943	22,289,681	48,692,050	1,430,246	312,344,457

*See footnote page 7.

†For non structural uses of lime and stone see chapter 9.

‡Includes lime used for chemical purposes.

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1934 and 1935 ⁽¹⁾

		1934		1935		Per cent Increase (+) or Decrease (-)	
		Quantity	Value	Quantity	Value	Quantity	Value
			\$		\$		\$
METALLICS							
Arsenic (As ₂ O ₃).....	lb.	1,647,513	56,412	2,558,789	75,326	+ 55.3	+ 33.5
Bismuth.....	lb.	253,644	301,215	13,797	13,245	- 94.6	- 95.6
Cadmium.....	lb.		95,665	580,530	441,203		+ 361.2
Chromite.....	tons	111	1,578	1,144	14,947	+ 930.6	+ 847.2
Cobalt.....	lb.	594,671	592,497	681,419	512,705	+ 14.6	- 13
Copper.....	lb.	364,761,062	26,671,438	418,997,700	32,311,960	+ 14.9	+ 21.1
Gold.....	fine oz.	2,972,074	61,438,220	3,284,890	67,904,700	+ 10.5	+ 10.5
Estimated exchange equalization paid for gold produced.....			41,098,333		47,690,579		+ 16.0
Lead.....	lb.	346,275,576	8,436,658	339,105,079	10,624,772	- 2.1	+ 25.9
Manganese ore.....	tons			100	800		
Molybdenite.....	lb.						
Nickel.....	lb.	128,687,340	32,139,425	138,516,240	35,345,103	+ 7.6	+ 10.0
Palladium, Rhodium, Iridium, etc.....	fine oz.	83,932	1,699,282	84,772	1,962,937	+ 1.0	+ 15.5
Platinum.....	fine oz.	116,230	4,490,763	105,374	3,445,730	- 9.3	- 23.3
Radium and Uranium.....				not available for publication			
Selenium.....	lb.	104,924	171,311	366,425	703,536	+ 249.2	+ 310.7
Silver.....	fine oz.	16,415,282	7,790,840	16,618,558	10,767,148	+ 1.2	+ 38.2
Tellurium.....	lb.	5,130	25,599	16,425	32,850	+ 220.2	+ 28.3
Titanium ore.....	tons	2,023	14,161	2,288	16,400	+ 13.1	+ 15.8
Zinc.....	lb.	298,579,683	9,087,571	320,649,859	9,936,908	+ 7.4	+ 9.4
Total.....			194,110,968		221,800,849		+ 14.3
NON-METALLICS—FUELS							
Coal.....	tons	13,810,193	42,045,942	13,888,006	41,963,110	+ 0.6	- 0.2
Natural gas.....	M cu. ft.	23,164,324	8,759,652	24,910,786	9,363,141	+ 7.5	+ 6.9
Peat.....	tons	1,878	7,343	1,340	5,761	- 28.7	- 21.5
Petroleum, crude.....	brls.	1,410,895	3,449,162	1,446,620	3,492,188	+ 2.5	+ 1.3
Total.....			51,262,099		54,824,200		+ 1.0
OTHER NON-METALLICS							
Actinolite.....	tons	30	365				
Asbestos.....	tons	155,980	4,936,326	210,467	7,054,614	+ 34.9	+ 42.9
Barytes.....	tons						
Bituminous sands.....	tons	862	3,449	40	160	- 95.4	- 95.4
Diatomite.....	tons	1,372	54,910	823	33,140	- 40.0	- 39.7
Feldspar.....	tons	18,302	147,281	17,742	144,330	- 3.1	- 2.0
Fluorspar.....	tons	150	2,100	75	900	- 50.0	- 57.1
Graphite.....	tons	1,518	71,424		79,781		+ 11.7
Grindstones†.....	tons	987	46,478	708	34,010		- 26.8
Gypsum.....	tons	461,237	863,776	541,864	932,203	+ 17.5	+ 7.9
Iron oxides (ochres).....	tons	4,959	66,166	5,516	77,075	+ 1.2	+ 16.5
Magnesian dolomite.....			382,927		486,084		+ 26.9
Magnesium sulphate.....	tons	42	1,100	340	7,965	+ 709.5	+ 624.1
Mica.....	tons	998	97,071	628	82,038	- 37.1	- 15.5
Mineral waters.....	imp. gal.	97,440	17,738	146,516	16,590	+ 50.4	- 6.5
Phosphate.....	tons	81	683	186	1,103	+ 129.6	+ 61.5
Quartz.....	tons	272,563	482,265	233,002	424,882	- 14.5	- 11.9
Salt.....	tons	321,753	1,954,953	360,343	1,880,978	+ 12.0	- 3.8
Silica brick.....	M	2,528	85,945	2,461	96,194	- 2.7	+ 11.9
Soapstone.....			44,297		32,053		- 27.6
Sodium carbonate.....	tons	244	1,920	242	2,430	- 0.8	+ 26.6
Sodium sulphate.....	tons	66,821	587,986	44,817	343,764	- 32.9	- 41.5
Sulphur*.....	tons	51,537	515,502	67,446	634,235	+ 30.9	+ 23.0
Talc.....	tons	13,959	136,480	13,803	139,479	- 1.1	+ 2.2
Volcanic dust.....	tons	31	620				
Total.....			10,501,762		12,504,008		+ 19.1
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
CLAY PRODUCTS							
Brick—Soft mud process {Face.....	M	4,904	76,247	6,995	122,215	+ 42.6	+ 60.3
{Common.....	M	14,256	183,585	21,197	259,504	+ 48.7	+ 41.4
Stiff mud process {Face.....	M	23,800	494,341	25,289	500,066	+ 6.3	+ 1.2
{Common.....	M	30,317	424,131	32,334	437,123	+ 6.7	+ 3.1
Dry press..... {Face.....	M	6,005	130,392	8,454	175,042	+ 40.8	+ 34.2
{Common.....	M	6,440	66,616	6,381	55,253	- 0.9	- 17.1
Fancy or ornamental brick.....	M	43	2,625	13	728	- 69.8	- 72.3
Sewer brick.....	M	307	5,992	175	5,236	- 43.0	- 12.6
Paving brick.....	M	10	382	15	627	- 50.0	- 64.1
Firebrick.....	M	2,109	101,219	1,817	90,149	- 13.9	- 10.9

(1) Unless otherwise noted, all total values of mineral production from 1931 to 1935, inclusive, include estimated exchange equalization on gold produced.

†Includes grindstones, pulpstones and scythestones.

*Sulphur content of pyrites shipped and estimated sulphur contained in the sulphuric acid made from smelter gases.

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1934 and 1935—Concluded

	1934		1935		Per cent Increase (+) or Decrease (—)	
	Quantity	Value	Quantity	Value	Quantity	Value
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—Concluded		\$		\$		\$
Fireclay and other clay..... tons	1,043	12,598	2,272	15,574	+ 117.8	+ 23.6
Kaolin..... tons	48	504	170	1,520	+ 254.2	+ 201.6
Fireclay blocks and shapes.....		62,388		71,344		+ 14.4
Hollow blocks..... tons	31,136	244,122	47,195	344,608	+ 51.6	+ 41.2
Roofing tile..... No.	44,115	1,852	82,015	3,669	+ 85.9	+ 98.1
Floor tile (quarries)..... sq. ft.	80,356	17,491	51,765	7,629	— 35.6	— 56.4
Ceramic tile.....				615		
Drain tile..... M	7,325	180,553	7,124	205,336	— 2.7	+ 37.3
Sewer pipe, copings, flue linings, etc.....		436,433		481,559		+ 10.3
Pottery, glazed or unglazed.....		223,733		220,711		— 1.4
Bentonite..... tons	63	1,578	41	731	— 34.9	— 50.5
Other clay products.....		13,628		13,274		— 2.6
Total.....		2,680,410		3,012,563		+ 12.4
OTHER STRUCTURAL MATERIALS						
Cement..... brls.	3,783,226	5,667,946	3,648,086	5,580,043	— 3.6	— 1.6
Lime..... tons	368,113	2,745,797	405,419	2,925,791	+ 10.1	+ 6.6
Sand and gravel..... tons	14,854,159	4,035,477	21,213,489	6,389,440	+ 42.8	+ 58.3
Slate..... tons	738	4,802	1,129	4,329	+ 53.0	— 9.9
Stone—						
Granite..... tons	200,285	781,739	326,354	1,126,287	+ 62.9	+ 44.1
Limestone..... tons	3,747,779	3,157,832	3,631,665	3,253,573	— 3.1	+ 3.0
Marble..... tons	13,783	69,475	15,975	85,369	+ 15.9	+ 22.9
Sandstone..... tons	115,169	143,283	342,824	838,005	+ 197.7	+ 484.9
Total.....		16,606,351		20,202,837		+ 21.7
Grand Total (Canadian Funds).....		278,161,590		312,344,457		+ 12.3

† Includes lime used for chemical purposes.

Table 3.—Mineral Production of Canada for the Period January 1 to June 30, 1935 and 1936

	1935		1936	
	January 1 to June 30		January 1 to June 30	
	Quantity	Value	Quantity	Value
METALLICS		\$		\$
Arsenic (As ₂ O ₃)..... lb.	1,729,143	49,978	642,309	20,095
Bismuth..... lb.	4,244	3,109	146,170	146,170
Cadmium..... lb.	238,187	121,475	336,936	350,413
Chromite.....		2,884		8,138
Cobalt..... lb.	253,998	168,856	438,773	356,118
Copper..... lb.	214,757,093	15,253,360	205,967,475	18,230,073
Gold..... fine oz.	1,509,521	31,204,568	1,769,206	36,572,782
Estimated exchange equalization on gold produced.....		21,779,619		25,526,398
Lead..... lb.	160,288,192	4,160,773	180,866,815	6,566,512
Nickel..... lb.	63,963,301	16,071,185	83,053,755	21,479,445
Palladium, Rhodium, Iridium, etc..... fine oz.	39,785	900,812	52,685	1,237,338
Platinum..... fine oz.	47,575	1,472,139	62,791	2,009,312
Radium and Uranium products.....		Data not available for publication		
Selenium..... lb.	160,483	308,127	175,017	316,781
Silver..... fine oz.	7,859,490	5,020,430	8,737,157	3,956,272
Tellurium..... lb.	7,038	34,345	25,892	46,606
Titanium ore..... tons	2,419	16,933		
Zinc..... lb.	154,678,039	4,245,286	157,869,552	5,225,482
Total.....		100,822,879		121,847,885
NON-METALLICS				
Fuels				
Coal..... tons	6,308,405	19,192,150	6,879,419	20,444,682
Natural gas..... M cu.ft.	12,689,935	4,695,774	15,808,755	6,035,390
Peat..... tons	82	420		
Petroleum, crude..... brls.	705,248	1,674,891	674,992	1,621,958
Total.....		25,563,235		28,102,030

Table 3.—Mineral Production of Canada for the Period January 1 to June 30, 1935 and 1936—Concluded

		1935		1936	
		January 1 to June 30		January 1 to June 30	
		Quantity	Value	Quantity	Value
OTHER NON-METALLICS			\$		\$
Asbestos.....	tons	81,907	2,777,057	120,437	4,016,912
Bituminous sands.....	tons				
Diatomite.....	tons	293	5,632	175	3,500
Feldspar.....	tons	5,269	48,125	7,867	66,768
Fluorspar.....	tons	24	312	6	90
Graphite.....			39,087		41,738
Gypsum.....	tons	174,970	343,120	265,309	462,857
Iron oxides (ochre).....	tons	2,072	31,443	1,548	21,395
Magnesium sulphate.....	tons	129	3,212	415	8,517
Magnesitic-dolomite.....			216,216		295,177
Mica.....	lb.	1,096,675	45,729	1,177,581	34,936
Mineral waters.....	imp. gal.	46,564	10,229	41,512	6,882
Nepheline syenite.....					9,069
Phosphate.....	tons	2	20	382	3,507
Quartz.....	tons	117,762	207,921	105,858	228,248
Salt.....	tons	163,464	807,159	176,901	826,695
Silica brick.....	M			437	20,568
Soapstone.....			14,821		11,713
Sodium carbonate.....	tons	120	1,204		
Sodium sulphate.....	tons	25,688	171,336	30,610	235,158
Sulphur (*).....	tons	28,555	289,746	48,652	442,631
Talc.....	tons	5,805	59,632	6,932	69,753
Total.....			5,072,051		6,806,114
STRUCTURAL MATERIALS					
Clay products.....			1,044,181		1,260,291
Cement.....	brls.	1,317,744	1,974,215	1,629,941	2,493,800
Lime†.....	tons	192,321	1,409,859	204,097	1,472,305
Stone and sand and gravel (†).....			2,950,000		3,500,000
Total (†).....			7,378,255		8,726,396
Grand Total.....			138,836,420		165,482,425

(*)Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

(†)Estimated.

‡ Includes lime used for chemical purposes.

Table 4.—Exchange Quotations (Dollars) at Montreal, 1935

	New York funds	London Sterling 4-8666	France Franc -0392	Germany Reichsmark -2382	Italy Lira -0526	Japan Yen -4985
January.....	.9986	4-8870	-0658	-4003	-0852	-2853
February.....	1-0013	4-8833	-0661	-4019	-0850	-2852
March.....	1-0067	4-8247	-0669	-4079	-0844	-2838
April.....	1-0049	4-8622	-0663	-4047	-0834	-2858
May.....	1-0015	4-8958	-0660	-4030	-0825	-2888
June.....	1-0014	4-9426	-0662	-4046	-0827	-2915
July.....	1-0022	4-9674	-0664	-4045	-0826	-2928
August.....	1-0027	4-9850	-0664	-4046	-0824	-2946
September.....	1-0080	4-9701	-0665	-4057	-0822	-2925
(*)October.....	1-0141	4-9778	-0668	-4079	-0824	-2908
(*)November.....	1-0105	4-9776	-0665	-4065	-0819	-2902
(*)December.....	1-0093	4-9755	-0666	-4059	-0816	-2902

NOTE.—The nominal closing quotations in Canadian funds upon which these averages are based have been supplied by the Bank of Montreal.

(*) Bank of Canada.

The promise of returning stability held out by exchange movements in the latter part of 1934, failed to materialize in 1935. Recurrent pressure upon the remaining "gold bloc" currencies gave warning of their continued precarious positions. The group was reduced late in March, when Belgium devalued its currency by approximately 28 per cent following a flight of capital and serious gold losses. Later on, the position of the Dutch guilder and the French franc became critical. These currencies were successfully defended, although in the last four months of the year, gold shipments from France approximated \$500,000,000.

The most outstanding currency crisis of 1936 occurred when on September 25, M. Vincent Auriol, the French Finance Minister, announced that the French government had decided to devalue the franc. He stated that its new value would be between the limits of 49 and 43 milligrammes of gold 0.900 fine (compared with the previous rate of 65.5 milligrammes) and that an exchange stabilization fund of 10,000 million francs would be set up. At the same time, M. Vincent Auriol revealed the terms of a monetary agreement reached between French, British and United States governments. Devaluation was later followed by Switzerland, Latvia, Turkey and Holland.

Prices.—Substantial gains in prices of non-ferrous metals, together with smaller rises in the iron and steel and the non-metallic groups, raised the index for raw and partly manufactured articles of mineral origin from 77.5 in 1934 to 79.6 in 1935. Definite improvement was recorded in the copper situation during 1935. World output was reduced approximately 20,000 tons per month as from June, owing to the restrictive measures adopted by seven of the greater copper interests. With world stocks declining, prices rose and electrolytic domestic copper, f.o.b. Montreal, averaged \$8.49 per 100 pounds, carlots, as compared with \$8.22 per 100 pounds in 1934. Lead and silver also moved forward. Speculative buying dominated silver markets in the early part of the year. Subsequent to the action of the United States Treasury in raising the price of newly mined silver to 77.57 cents per ounce on April 24, silver prices on the 26th reached peaks for the year of 81 cents per ounce at New York and 36½ d. per ounce at London. No further rise in the United States official price followed and quotations broke sharply by 4½ cents at New York and 1½ d. per ounce at London, on the following day. During the remainder of the year, the situation continued to be influenced chiefly by the revised buying policy of the United States Treasury. Fine silver at New York averaged 64.3 cents per ounce (Canadian funds) in 1935 as against 47.4 cents per ounce in the previous year. An informal curtailment agreement among the principal lead producers limited output in 1935 while consumption increased. Quotations for domestic lead, f.o.b. Montreal, moved up from \$3.41 in 1934 to \$4.81 per 100 pounds in 1935. Although rumours of the renewal of the International Zinc Cartel were current from time to time, world output remained unrestricted and production advanced about 165,000 metric tons. Consumption was also greater than in the preceding year, and quotations for domestic zinc at \$3.99 per 100 pounds, f.o.b. Montreal, were only 7 cents per 100 pounds less than in 1934. The expansion in Canadian steel industry was accompanied by increased activity and demand from the auto and farm implement manufacturing industries and from the building trades. Prices ruled firm, No. 1 foundry pig iron rising from \$20.46 in 1934 to \$20.50 per gross ton, f.o.b. sellers' works in 1935. Higher quotations for coal were largely influential in advancing the index for raw and partly manufactured materials of non-metallic origin from 85.7 in 1934 to 86.2 in 1935. During this period, No. 1 buckwheat Welsh anthracite coal moved up from \$8.88 per ton ex-yard Montreal to \$9.08 per ton, and British Columbia run of mine advanced from \$3.50 to \$3.79 per gross ton, f.o.b. mines. (Internal Trade Branch.)

Table 5.—Metal Prices, 1931-1935*

Metal	Market	Unit	1931	1932	1933	1934	1935
			\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound.....	0.06720	0.05592	0.06528	0.08901	0.13616
Arsenic, white.....	New York.....	Pound.....	0.045	0.04	0.04	0.04	0.035
Cobalt.....	New York.....	Pound.....	2.50	2.50	2.80	2.50	2.50
Cobalt oxide.....	New York.....	Pound.....	1.75	1.35	1.35	1.35	1.37
	New York.....	Pound.....	0.08116	0.05555	0.07025	0.08428	0.08649
Copper.....	Montreal.....	Pound.....	0.10006	0.07516	0.08684	0.0822	0.08488
	London.....	Long ton.....	42.093	35.962	36.359	33.319	35.430
Gold (in Canadian funds).....		Fine oz.....	21.55	23.48	28.60	34.50	35.19
	New York.....	Pound.....	0.04243	0.03180	0.038	0.03860	0.04065
Lead.....	Montreal.....	Pound.....	0.04168	0.03511	0.03705	0.04488	0.03925
	London.....	Long ton.....	12.958	11.913	11.670	10.935	14.238
Nickel.....	New York.....	Pound.....	0.36	0.35	0.35	0.35	0.35
Platinum.....	London.....	Fine oz.....	35.665	10.104	7.630	7.75	7.325
Silver.....	New York.....	Fine oz.....	0.287	0.27892	0.34727	0.47973	0.64273
Tin.....	New York.....	Pound.....	0.24467	0.22017	0.39110	0.52191	0.50420
	St. Louis.....	Pound.....	0.0364	0.02876	0.04029	0.04158	0.04328
Zinc.....	Montreal.....	Pound.....	0.03961	0.03724	0.04488	0.04059	0.03992
	London.....	Long ton.....	12.215	13.545	15.666	13.657	14.082

* All prices in dollars per unit excepting London copper, lead and zinc prices, which are quoted in £ sterling per long ton, and from 1932 the price of platinum is quoted in £ sterling per fine ounce.

Table 6.—Annual Values of the Mineral Production of Canada, 1926-1935

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1926.....	240,437,123	25.44	1931.....	230,434,726	22.21
1927.....	247,356,695	25.67	1932.....	191,228,225	18.20
1928.....	274,989,487	27.96	1933.....	221,495,253	20.74
1929.....	310,850,246	31.00	1934.....	278,161,590	25.67
1930.....	279,873,578	27.42	1935.....	312,344,457	28.56

NOTE.—For years 1886 to 1925 see previous reports.

Table 7.—Annual Values of the Mineral Production of Canada, by Classes, 1926-1935

Year	Metallics	Non-metallics, including fuels	Clay products and other structural materials	Total
	\$	\$	\$	\$
1926.....	115,237,581	85,240,144	39,959,398	240,437,123
1927.....	113,561,030	88,986,246	44,809,419	247,356,695
1928.....	132,012,454	93,239,852	49,737,181	274,989,487
1929.....	154,454,056	97,861,356	58,534,834	310,850,246
1930.....	142,743,764	83,402,349	53,727,465	279,873,578
1931.....	120,930,147	65,346,284	44,158,295	230,434,726
1932.....	112,041,763	56,788,179	22,398,283	191,228,225
1933.....	147,015,593	57,782,973	16,696,687	221,495,253
1934.....	194,110,968	64,763,861	19,286,761	278,161,590
1935.....	221,800,849	67,328,208	23,215,400	312,344,457

NOTE.—For years 1907-1925 see previous reports.

Table 8.—Values of the Mineral Production of Canada, by Provinces, 1926-1935

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1926..	28,873,792	1,811,104	25,956,193	84,702,296	3,073,528	1,193,394	26,977,027	65,622,976	2,226,813
1927..	30,111,221	2,148,535	28,870,403	89,982,962	2,888,912	1,455,225	29,309,223	60,801,170	1,789,044
1928..	30,524,392	2,198,919	37,037,420	99,584,718	4,186,853	1,719,461	32,531,416	64,496,351	2,709,957
1929..	30,904,453	2,439,072	46,358,285	117,662,505	5,423,825	2,253,506	34,739,986	68,162,878	2,905,736
1930..	27,019,367	2,383,571	41,215,220	113,530,976	5,453,182	2,368,612	30,427,742	54,953,320	2,521,588
1931..	21,081,157	2,176,910	35,964,537	97,975,915	10,057,808	1,931,880	23,580,901	35,480,701	2,184,917
1932..	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365	1,681,728	21,174,061	27,326,173	2,014,618
1933..	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,504	2,073,052
1934..	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934	2,977,061	20,228,851	41,206,965	1,669,083
1935..	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417	3,816,943	22,289,681	48,692,050	1,430,246

NOTE.—For years 1899-1925 see previous reports.

* Includes small production from the Northwest Territories since 1932.

Table 9.—Percentage of the Total Value of the Mineral Production of Canada, by Provinces, 1931-1935

Province	1931	1932	1933	1934	1935
Nova Scotia.....	9.24	8.9	7.7	8.4	7.4
New Brunswick.....	0.96	1.2	0.9	0.8	0.9
Quebec.....	15.65	13.4	12.7	11.2	12.5
Ontario.....	42.15	43.5	49.8	52.3	50.9
Manitoba.....	4.37	4.8	4.1	3.5	3.9
Saskatchewan.....	0.85	0.9	1.1	1.1	1.2
Alberta.....	10.34	11.6	8.9	7.3	7.1
British Columbia.....	15.50	14.7	13.9	14.8	15.6
*Yukon.....	0.94	1.0	0.9	0.6	0.5
Canada.....	100.00	100.00	100.00	100.00	100.00

* Includes small production from the Northwest Territories since 1932.

NOTE.—In the following provincial tables the value of gold includes the exchange equalization. For further information on the price of gold see Chapter II.

Table 10.—Mineral Production of Nova Scotia,* 1933-1935

Product	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Gold..... fine oz.	1,382	39,525	3,525	121,613	9,376	329,942
Silver..... fine oz.	104	39	321	152	372	241
Manganese ore..... tons						
NON-METALLICS—						
Barytes..... tons		15,969,793	6,341,625	21,860,093	5,822,075	20,391,227
Coal..... tons	4,557,590	34,940	1,320	52,800	666	26,660
Diatomite..... tons	1,747	868	50	1,762	50	2,006
Grindstones..... tons	21	363,528	378,287	488,044	454,703	523,216
Gypsum..... tons	315,948	1,447	7,292	12,107	9,640	13,978
Quartz..... tons	1,017	161,889	42,886	191,917	38,701	161,659
Salt..... tons	34,278	15,834	2,159	71,215	1,968	73,218
Silica brick..... M	453					
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		125,500		157,158		270,478
Lime—						
Quicklime..... tons	3,325	24,270	8,298	63,630	10,998	80,408
Hydrated..... tons	589	5,890	622	4,324	333	2,290
Sand and gravel..... tons	282,228	126,031	256,572	114,597	1,423,557	685,973
Stone..... tons	41,449	96,629	123,068	171,317	212,465	621,832
Total.....		16,966,183		23,310,729		23,183,128

* In 1935, 208,002 long tons of pig iron were produced in Nova Scotia from Newfoundland ores; production in 1934 totalled 133,360 long tons.

Table 11.—Mineral Production of New Brunswick, 1933-1935

		1933		1934		1935	
		Quantity	Value	Quantity	Value	Quantity	Value
			\$		\$		\$
METALLICS—							
Manganese ore.....	tons					100	800
NON-METALLICS—							
Coal.....	tons	312,303	1,041,744	314,750	1,026,343	346,024	1,129,019
Grindstones.....	tons	277	12,051	535	27,091	456	21,175
Gypsum.....	tons	30,391	88,500	30,398	104,709	30,796	105,960
Manganese, bog.....	tons						
Natural gas.....	M cu. ft.	618,033	302,705	625,601	306,005	615,454	303,886
Petroleum.....	brls.	8,835	18,111	11,106	22,277	12,954	18,230
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—							
Clay products.....			46,917		59,897		62,478
Lime—							
Quicklime.....	tons	8,059	68,446	8,949	76,132	9,569	74,721
Hydrated.....	tons	8,790	66,340	8,803	50,277	6,703	50,054
Sand and gravel.....	tons	496,961	331,497	568,064	322,238	1,813,206	845,981
Stone.....	tons	16,714	131,370	37,918	161,182	85,144	208,723
Total			2,107,682		2,156,151		2,821,027

Table 12.—Mineral Production of Quebec,* 1933-1935

Product		1933		1934		1935	
		Quantity	Value	Quantity	Value	Quantity	Value
			\$		\$		\$
METALLICS—							
Chromite.....	tons	30	343	71	1,098	346	— 5,371
Copper.....	lb.	69,943,882	5,214,177	73,968,545	5,487,948	79,050,906	6,162,350
Gold.....	fine oz.	382,886	10,950,539	390,097	13,458,347	470,552	16,558,725
Lead.....	lb.					2,047,624	64,156
Selenium.....	lb.	22,131	16,600	48,764	73,146	206,421	395,328
Silver.....	fine oz.	471,419	178,351	470,254	223,187	668,836	433,338
Tellurium.....	lb.					1,708	3,416
Titanium ore, sold for export.....	tons			2,023	14,161	2,288	16,400
Zinc.....	lb.					5,322,844	164,955
NON-METALLICS—							
Asbestos.....	tons	158,367	5,211,177	155,980	4,936,326	210,467	7,054,614
Feldspar.....	tons	6,183	59,283	9,207	78,853	7,002	63,075
Graphite.....	tons	43	2,222	129	6,426	21	1,281
Iron oxides (ochre).....	tons	4,192	51,965	4,798	64,566	5,357	75,388
Magnesitic dolomite.....			360,128		382,927		486,084
Mica.....	tons	256	39,060	322	85,967	373	74,894
Natural mineral waters.....	imp. gal.	9,024	3,094	75,665	16,116	126,616	15,113
Peat.....	tons	681	2,549				
Phosphate.....	tons	105	805	81	683	116	1,043
Quartz.....	tons	28,294	109,533	57,208	229,817	51,948	226,839
Sulphur.....	tons	19,167	146,261	4,908	50,398	7,370	47,779
Soapstone.....			47,680		44,297		32,053
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—							
Cement.....	brls.	1,517,555	2,128,900	1,613,641	2,294,847	1,751,012	2,472,008
Clay products.....			580,088		632,322		593,162
Lime—							
Quicklime.....	tons	89,740	539,603	85,106	510,614	91,086	545,956
Hydrated lime.....	tons	20,594	107,955	23,584	121,370	25,387	132,910
Sand and gravel.....	tons	3,356,232	942,429	3,672,582	980,454	5,268,987	1,442,468
Stone.....	tons	1,342,493	1,448,740	1,199,152	1,575,617	1,390,517	2,053,761
Slate.....	tons			306	458	819	1,229
Total			28,141,482		31,269,945		39,124,696

* There is also in this province an important production of aluminium from imported ores.

Table 13.—Mineral Production of Ontario,* 1933-1935

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As ² O ₃)..... lb.	1,468,022	56,534	1,647,513	56,412	2,558,789	75,326
Bismuth..... lb.	7,580	3,731	7,552	3,444	7,079	6,796
Chromite..... tons	.....	.....	40	.....	.....	9,576
Cobalt..... lb.	466,702	597,752	594,671	592,497	681,419	512,705
Copper..... lb.	145,504,720	10,118,847	205,059,539	14,822,704	252,027,928	19,295,965
Gold..... fine oz.	2,155,519	61,647,843	2,105,339	72,634,195	2,220,336	78,133,624
Lead..... lb.	29,910	692	21,558	525	22,532	706
Nickel..... lb.	83,264,658	20,130,480	128,687,340	32,139,425	138,516,240	35,845,103
Palladium, Rhodium, etc..... fine oz.	31,009	645,043	83,932	1,699,282	84,772	1,962,937
Platinum..... fine oz.	24,746	856,190	116,177	4,488,712	105,335	3,444,455
Selenium..... lb.	26,090	53,745	51,574	91,286	75,363	144,697
Silver..... fine oz.	4,535,680	1,715,975	5,321,160	2,525,470	5,161,651	3,844,229
Tellurium..... lb.	.....	.....	5,130	25,599	14,275	28,550
NON-METALLICS—						
Actinolite..... tons	.....	.....	30	365	.....	m
Barytes..... tons	20	60	.....	.....	.....	.....
Diatomite..... tons	28	1,298	46	1,920	100	4,600
Feldspar..... tons	4,387	45,350	7,302	61,665	8,656	75,003
Fluorspar..... tons	73	1,064	150	2,100	75	900
Graphite..... tons	362	16,145	1,389	64,998	1,761	78,500
Gypsum..... tons	24,460	112,319	33,234	141,389	38,247	164,807
Mica..... tons	666	9,371	618	9,059	255	7,144
Natural mineral waters..... imp. gal.	29,794	2,347	21,775	1,622	19,900	1,477
Natural gas..... M cu. ft.	7,166,659	4,523,085	7,682,851	4,741,368	8,158,825	4,938,084
Peat..... tons	450	900	1,878	7,343	1,340	5,761
Petroleum..... brls.	136,058	253,486	141,385	299,874	165,041	346,156
Phosphate..... tons	.....	.....	.....	.....	70	60
Quartz..... tons	66,562	86,146	89,838	134,572	83,034	120,005
Salt..... tons	244,107	1,755,087	276,751	1,734,196	320,003	1,698,508
Silica brick..... M	183	7,351	369	14,730	493	22,976
Sulphur..... tons	8,196	81,960	14,598	145,980	13,292	132,920
Talc..... tons	15,114	142,134	13,934	135,978	13,710	138,161
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	1,095,845	1,587,812	1,702,128	2,403,590	1,243,836	1,752,148
Clay products.....	.....	1,024,579	.....	1,261,006	.....	1,370,225
Lime—						
Quicklime..... tons	126,460	1,006,906	168,760	1,287,251	196,761	1,470,721
Hydrated..... tons	19,733	220,291	22,281	249,038	23,379	226,146
Sand and gravel..... tons	5,967,994	2,517,230	7,880,959	1,821,689	8,770,117	2,211,406
Stone..... tons	1,253,906	983,268	2,460,300	1,965,507	2,122,941	1,863,892
Slate..... tons	.....	.....	120	600	.....	.....
Total..... \$		110,205,021		145,565,871		158,934,269

*The total production of blast-furnace pig-iron in Ontario in 1933, was 108,803 long tons, in 1934, 271,635 long tons and in 1935, 391,873 long tons.

†Sulphur content of pyrites shipped or estimated sulphur contained in the sulphuric acid made from smelter gases.

Table 14.—Mineral Production of Manitoba, 1933-1935

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Copper..... lb.	38,163,181	2,844,989	30,867,141	2,290,126	38,011,371	2,963,146
Gold..... fine oz.	125,310	3,583,866	132,321	4,565,075	142,613	5,018,551
Lead..... lb.	.....	.....	.....	.....	19,179	601
Selenium..... lb.	.....	.....	4,127	6,190	65,074	124,942
Silver..... fine oz.	1,101,578	416,758	1,252,920	594,647	1,206,454	781,660
Tellurium..... lb.	.....	.....	.....	.....	340	680
Zinc..... lb.	43,516,037	1,397,082	47,264,342	1,438,538	51,129,980	1,584,513
NON-METALLICS—						
Coal..... tons	3,880	9,214	4,113	8,952	3,106	7,408
Feldspar..... tons	88	484	1,793	6,763	2,084	6,252
Gypsum..... tons	6,830	65,471	9,657	81,553	10,500	85,885
Natural gas..... M cu.ft.	600	180	600	180	600	180
Quartz..... tons	7,736	23,507	931	3,031	147	220
Salt..... tons	1,499	18,388	1,664	20,137	1,538	18,765
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	129,540	295,351	181,166	411,247	266,457	604,857
Clay products.....	.....	20,966	.....	37,916	.....	74,755
Lime—						
Quicklime..... tons	14,793	110,957	12,988	100,958	14,594	115,149
Hydrated..... tons	3,239	56,683	3,580	62,650	4,021	70,368
Sand and gravel..... tons	288,214	108,828	334,026	95,426	1,399,659	404,730
Stone..... tons	33,190	74,227	43,127	53,545	146,614	189,755
Total..... \$		9,026,951		9,776,934		12,052,417

Table 15.—Mineral Production of Saskatchewan, 1933-1935

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Copper..... lb.	3,223,941	240,338	6,618,913	491,077	11,429,452	890,974
Gold..... fine oz.	5,400	154,440	5,405	186,472	14,325	504,026
Selenium..... lb.			459	689	19,567	37,569
Silver..... fine oz.	114,604	43,358	87,551	41,552	201,608	130,622
Tellurium..... lb.					102	204
Zinc..... lb.	2,789,683	89,563	2,162,938	65,831	8,974,720	278,126
Coal..... tons	927,649	1,285,996	909,288	1,241,130	921,785	1,293,668
Quartz..... tons	59,506	59,506	92,447	88,748	77,177	59,069
Salt..... tons	231	4,510	452	8,703	101	2,046
Sodium sulphate..... tons	50,080	485,416	66,821	587,986	44,817	343,764
Volcanic dust..... tons	118	2,360	1	20		
Natural gas..... M cu.ft.			13,781	4,823	75,558	7,555
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products..... tons		92,207		90,997		98,150
Sand and gravel..... tons	104,400	19,731	533,575	169,033	502,732	171,170
Total..... \$		2,477,425		2,977,061		3,816,943

Table 16.—Mineral Production of Alberta, 1933-1935

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	324	9,267	393	13,558	150	5,279
Silver..... fine oz.	32	12	35	17	16	10
NON-METALLICS—						
Bituminous sands..... tons	466	1,662	862	3,449	40	160
Coal..... tons	4,718,788	12,307,258	4,753,810	12,556,099	5,462,894	14,094,795
Natural gas..... M cu.ft.	15,352,811	3,886,263	14,841,491	3,707,276	16,060,349	4,113,436
Petroleum..... brls.	995,832	2,844,157	1,253,966	3,104,823	1,263,510	3,102,227
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	149,206	299,530	163,946	326,253	219,555	436,914
Clay products.....		198,373		246,677		326,679
Lime—						
Quicklime..... tons	7,403	61,061	7,300	64,143	6,354	54,803
Hydrated..... tons	98	976	155	1,554	230	2,305
Sand and gravel..... tons	281,122	85,577	650,232	196,898	653,511	146,092
Stone..... tons	1,550	8,817	2,737	8,104	2,242	6,981
Total..... \$		19,702,953		20,228,851		22,289,681

Table 17.—Mineral Production of British Columbia, 1933-1935

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Bismuth..... lb.	70,723	77,795	246,092	297,771	6,718	6,449
Cadmium..... lb.		78,733		95,665	580,530	441,203
Copper..... lb.	43,146,724	3,216,502	48,246,924	3,579,583	38,478,043	2,999,525
Gold..... fine oz.	238,995	6,835,257	296,196	10,218,762	391,633	13,781,565
Lead..... lb.	263,345,776	6,298,178	344,467,138	8,392,597	336,784,326	10,552,059
Platinum..... fine oz.	40	1,400	53	2,051	39	1,275
Silver..... fine oz.	6,737,057	2,548,817	8,729,721	4,143,204	9,178,400	5,946,677
Zinc..... lb.	152,826,264	4,906,487	249,152,403	7,583,202	255,222,315	7,909,314
NON-METALLICS—						
Coal..... tons	1,382,272	5,306,287	5,485,969	5,351,108	1,331,287	5,043,510
Diatomite..... tons	14	410	6	190	57	1,880
Grindstones, pulpstones..... tons	200	9,000	402	17,625	202	10,829
Gypsum..... tons	5,107	46,004	9,661	48,081	7,618	52,335
Iron oxides (ochre)..... tons	165	1,485	161	1,600	159	1,687
Magnesium Sulphate..... tons	120	3,360	42	1,100	340	7,965
Mica..... tons	23	853	57	2,045		
Phosphate..... tons	2,109	4,670				
Quartz..... tons	22,668	17,681	24,847	13,990	11,056	4,771
Sodium carbonate..... tons	559	5,773	244	1,920	242	2,430
Sulphur*..... tons	30,010	282,078	32,031	319,124	46,784	453,536
Talc..... tons	67	1,022	25	502	93	1,318
Volcanic dust..... tons			30	600		

*Includes sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

Table 17.—Mineral Production of British Columbia, 1933-1935—Concluded

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	115,286	225,342	122,345	232,009	167,226	314,116
Clay products.....		174,205		194,437		216,636
Lime—						m
Quicklime..... tons	18,147	144,479	16,721	135,528	12,685	83,664
Hydrated..... tons	2,570	18,449	2,966	18,328	3,319	16,296
Sand and gravel..... tons	961,672	332,962	958,149	335,142	1,381,720	481,620
Slate..... tons	250	3,750	312	3,744	310	3,100
Stone..... tons	250,272	253,525	210,714	217,057	356,895	358,290
Total..... \$		30,794,504		41,206,965		48,692,050

Table 18.—Mineral Production of Yukon, 1933-1935

Products	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold..... fine oz.	39,493	1,129,500	38,798	1,338,531	35,707	1,256,529
Lead..... lb.	3,099,505	74,128	1,783,349	43,450	218,513	6,846
Silver..... fine oz.	2,204,237	833,925	515,542	244,681	54,715	35,450
NON-METALLICS—						
Coal..... tons	862	3,670	638	2,217	835	3,423
Total..... \$		2,041,223		1,623,879		1,302,308

Table 19.—Mineral Production of Northwest Territories, 1933-1935

Products	1933		1934*		1935*	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Gold..... oz.					200	7,038
Radium and Uranium products.....			Not available for publication.			
Lead..... lb.			3,531	86	12,905	404
Silver..... fine oz.	23,239	8,792	37,778	17,930	146,506	94,921
Petroleum, crude..... brls.	4,608	23,037	4,438	22,188	5,115	25,575
Total..... \$		31,829		40,204		127,938

*During 1934 the Port Hope (Ontario) refinery of Eldorado Gold Mines, Ltd., received from the Eldorado mine at Great Bear Lake, N.W.T., 77 tons of pitchblende and silver ore and seven tons of concentrates. Twenty-six tons of ore were treated during the year with recovery of radium, uranium, silver and lead amounting to \$210,000. During 1935 the mill at the mine treated 14,402 tons of ore; pitchblende and silver concentrates totalled 296 tons valued at \$752,918; during 1935 recovery at the Port Hope refinery of radium, uranium, silver and lead amounted to about \$490,000.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1931-1935

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$
Metal Mining Industry							
ALLUVIAL GOLD MINES							
1931.....	109	109	5,908,001	337	682,935	41,745	1,226,541
1932.....	120	120	7,306,130	373	665,711	38,840	1,211,018
1933.....	73	74	10,402,705	454	704,151	35,165	1,218,250
1934.....	93	93	14,315,701	615	1,027,569	76,615	1,260,483
1935.....	84	86	9,198,533	702	1,227,971	70,534	2,106,025
AURIFEROUS QUARTZ MINES							
1931.....	68	69	109,933,164	9,636	16,467,165	2,700,326	49,144,578
1932.....	100	100	58,167,335	10,442	17,686,584	3,031,494	58,645,772
1933.....	214	216	158,599,931	12,823	20,536,012	3,330,137	69,151,535
1934.....	408	416	214,068,359	17,762	27,156,887	4,249,296	83,761,440
1935.....	377	384	193,728,802	19,834	31,523,907	5,002,274	75,120,774
COPPER-GOLD-SILVER MINES (a)							
1931.....	53	56	37,127,920	3,351	4,958,317	726,502	15,951,103
1932.....	28	30	14,793,372	3,076	3,770,627	463,463	11,143,759
1933.....	28	29	40,228,626	2,841	3,938,778	404,625	7,707,270
1934.....	21	23	39,892,387	3,169	4,869,801	542,670	8,265,071
1935.....	16	18	38,461,682	3,430	5,040,196	554,152	13,243,163
SILVER-COBALT MINES							
1931.....	22	26	9,352,520	786	1,149,689	227,467	1,925,593
1932.....	17	20	3,005,872	369	551,255	124,478	1,735,708
1933.....	12	14	3,365,755	242	322,281	83,565	1,071,602
1934.....	15	16	5,102,491	286	361,726	85,685	1,380,318
1935.....	27	28	6,380,731	402	494,791	114,439	2,070,716
SILVER-LEAD-ZINC MINES*							
1931.....	39	40	31,152,078	1,299	2,149,921	485,106	6,351,975
1932.....	36	36	11,921,067	1,084	1,719,186	358,649	5,156,365
1933.....	42	43	17,705,026	1,100	1,501,012	284,277	7,569,867
1934.....	58	60	12,923,827	1,292	1,935,284	389,276	8,885,081
1935.....	69	70	16,596,941	1,657	2,431,110	438,126	10,553,086
NICKEL-COPPER MINES							
1931.....	3	6	21,320,977	2,133	3,150,240	105,403	7,539,836
1932.....	3	6	23,137,628	1,210	1,776,190	96,670	3,174,208
1933.....	4	7	30,048,125	1,599	2,518,181	152,984	6,108,325
1934.....	4	7	31,685,426	2,677	4,375,702	233,963	11,606,713
1935.....	4	7	26,685,284	3,552	6,059,407	259,257	11,100,621
MISCELLANEOUS METAL MINES							
1931.....	7	7	444,179	32	25,694	576	13,434
1932.....	5	5	1,140,200	34	35,181	2,475	1,113
1933.....	5	5	563,500	24	14,275	1,178	343
1934.....	7	7	1,548,205	44	32,273	2,383	15,739
1935.....	12	12	733,497	82	63,612	4,051	22,847
NON-FERROUS METAL SMELTING AND REFINING							
1931.....	11	14	175,669,195	7,860	13,245,327	6,053,398	†50,229,454
1932.....	10	13	149,708,860	5,843	8,778,970	4,435,394	†38,722,129
1933.....	11	14	146,065,284	6,360	8,403,181	2,792,322	†57,318,734
1934.....	11	14	146,047,422	8,298	11,059,206 (b)	3,564,712	†71,610,687
1935.....	12	14	145,686,299	8,944	12,687,356 (b)	3,776,381	59,441,583
Total Metal Mining Industries							
1931.....	312	327	390,908,034	25,434	41,829,288	10,340,523	132,382,514
1932.....	319	330	269,180,464	21,931	34,983,704	8,551,463	119,790,072
1933.....	389	402	406,998,952	25,443	37,937,871	7,084,253	150,145,926
1934.....	617	636	463,583,818	34,143	56,818,448	9,144,600	186,755,532
1935.....	601	619	437,471,769	38,603	59,528,350	10,199,214	173,588,815

* Contains data relating to silver ores in the Northwest Territories since 1931. † Value added by smelting.

(a) The considerable decrease in the value of 1933 and 1934 shipments as compared with those for previous years results largely from low copper prices and through companies reporting ore costs rather than estimates of market prices for metal contents. This practice of reporting costs is confined to some of the larger base metal mining companies which operate both mines and metallurgical plants. Decreases of this nature in the value of mine products are compensated for by increases in the non-ferrous smelting and refining industry and thereby do not affect the grand total representing the net value of Canadian mineral sales.

(b) See footnote, tables 26 and 27.

(c) See footnote at end of table 19.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1931-1935—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of fuel and electricity for heat and power	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
Non-Metal Mining Industries, Including Fuels							
* FUELS							
COAL							
1931.....	412	452	135,712,866	27,860	28,802,428	3,060,487	37,762,927
1932.....	455	493	131,879,671	26,960	25,042,769	3,066,601	34,984,922
1933.....	496	547	125,740,790	25,375	22,378,736	3,214,632	33,805,148
1934.....	503	534	118,274,406	25,961	25,662,591	3,448,787	39,394,294
1935.....	516	556	110,516,517	26,198	26,595,344	3,404,756	26,894,671
NATURAL GAS							
1931.....	145	2,444	71,085,678	1,692	2,072,022	26,921	8,232,822
1932.....	160	2,418	75,187,066	1,351	1,738,949	32,912	8,188,966
1933.....	174	2,515	80,937,170	1,367	1,650,815	53,994	7,725,951
1934.....	171	2,682	70,767,123	1,553	1,789,811	67,341	7,569,935
1935.....	199	3,190	69,221,051	1,719	1,932,937	66,093	6,580,061
PETROLEUM							
1931.....	160	2,346	57,620,950	1,209	1,634,517	303,511	4,733,287
1932.....	175	2,210	48,568,562	655	776,163	120,842	3,467,538
1933.....	175	2,128	36,972,528	718	773,734	136,278	3,562,170
1934.....	189	2,219	35,408,801	944	1,072,617	168,338	3,622,722
1935.....	244	2,285	33,398,894	940	1,046,046	160,678	3,217,927
TOTAL FUELS							
1931.....	717	5,242	264,419,494	30,761	32,508,967	3,390,919	50,729,036
1932.....	790	5,121	255,635,299	28,966	27,557,881	3,220,355	46,641,426
1933.....	845	5,190	243,650,438	27,460	24,803,285	3,404,904	45,093,269
1934.....	863	5,435	224,450,330	28,453	23,525,019	3,684,466	50,586,951
1935.....	959	6,031	213,136,462	28,857	29,574,327	3,631,527	36,692,659
OTHER NON-METAL MINING INDUSTRIES							
ABRASIVES—NATURAL							
1931.....	8	8	569,772	31	25,837	3,906	73,452
1932.....	10	10	679,865	36	26,471	2,422	48,844
1933.....	9	10	58,556	19	7,796	1,034	60,927
1934.....	11	12	234,776	34	20,580	2,616	102,008
1935.....	9	9	114,114	42	25,135	4,120	60,824
ASBESTOS							
1931.....	7	8	40,164,005	1,675	1,836,115	849,047	4,812,886
1932.....	7	8	30,081,362	1,409	1,156,315	827,303	3,039,721
1933.....	7	8	21,109,967	1,629	1,279,093	771,327	5,211,177
1934.....	7	8	21,816,350	1,855	1,608,812	855,556	4,936,326
1935.....	8	9	16,805,583	2,072	1,904,053	923,483	4,996,163

* Production of peat since 1929 included in the miscellaneous non-metallics.

(c) See footnote at end of table 19.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1931-1935—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of fuel and electricity for heat and power	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
<i>OTHER NON-METAL MINING INDUSTRIES—Concluded</i>							
<i>FELDSPAR AND QUARTZ</i>							
1931.....	33	36	1,342,668	166	135,809	20,996	490,119
1932.....	33	33	936,177	120	91,603	13,391	358,129
1933.....	28	28	1,143,792	146	117,037	26,327	402,937
1934.....	50	51	1,310,182	312	205,508	45,854	629,546
1935.....	28	28	1,151,986	260	182,792	41,555	511,200
<i>GYPSUM</i>							
1931.....	15	19	7,941,082	676	656,590	188,524	2,111,517
1932.....	11	17	8,054,148	478	368,484	122,926	1,080,379
1933.....	10	16	8,769,564	415	263,279	91,518	675,822
1934.....	8	14	7,352,562	428	324,731	118,560	863,776
1935.....	6	13	5,737,114	467	367,007	121,614	745,176
<i>IRON OXIDES (OCHRE)</i>							
1931.....	4	4	181,535	30	29,194	8,560	49,205
1932.....	4	4	206,863	26	22,909	5,993	46,161
1933.....	4	4	156,551	22	15,631	5,755	53,450
1934.....	4	4	172,730	32	24,980	9,670	66,166
1935.....	5	5	175,935	32	26,748	12,254	64,836
<i>MICA</i>							
1931.....	11	11	276,356	28	22,556	444	54,066
1932.....	5	5	119,670	9	7,864	50	6,828
1933.....	15	15	312,396	41	25,007	80	49,284
1934.....	16	16	139,716	102	50,391	50	97,071
1935.....	24	24	145,557	92	45,217	347	81,343
<i>SALT</i>							
1931.....	7	7	4,196,927	363	446,984	184,001	1,904,149
1932.....	7	8	3,805,008	345	455,049	176,836	1,947,551
1933.....	9	9	3,708,358	400	473,420	191,373	1,939,874
1934.....	9	9	3,711,598	469	551,998	236,257	1,954,953
1935.....	10	10	3,776,333	473	597,785	175,240	1,667,038
<i>TALC AND SOAPSTONE</i>							
1931.....	5	5	618,590	70	71,787	19,128	157,083
1932.....	5	5	703,532	83	76,577	17,930	159,038
1933.....	7	7	684,375	103	83,060	26,424	190,836
1934.....	8	8	640,194	112	79,711	26,312	180,777
1935.....	8	8	639,501	94	69,803	23,774	134,121
<i>MISCELLANEOUS</i>							
1931.....	34	34	5,457,930	275	297,394	205,149	1,247,697
1932.....	35	35	2,072,913	182	155,166	110,396	1,061,779
1933.....	40	40	4,202,736	297	241,999	176,512	1,234,629
1934.....	48	48	3,291,842	393	371,762	240,224	1,162,980
1935.....	44	44	2,555,124	366	357,837	219,057	785,784

(c) See footnote at end of table 19.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1931-1935—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of fuel and electricity for heat and power	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
<i>TOTAL OTHER NON-METAL MINING INDUSTRIES</i>							
1931.....	124	132	60,748,865	3,314	3,522,266	1,479,755	10,900,174
1932.....	117	125	46,659,538	2,688	2,360,438	1,277,247	7,748,430
1933.....	129	137	40,146,295	3,072	2,506,322	1,290,350	9,818,936
1934.....	161	170	58,669,950	3,737	3,238,473	1,535,099	9,993,603
1935.....	142	150	31,101,247	3,898	3,576,377	1,521,444	9,046,485

Total Non-Metal Mining Industries, Including Fuels

1931.....	841	5,374	325,168,359	34,075	36,031,233	4,870,674	61,629,210
1932.....	907	5,246	302,294,837	31,654	29,918,319	4,497,602	54,359,856
1933.....	974	5,327	253,796,783	30,532	27,309,607	4,695,254	54,912,205
1934.....	1,024	5,695	263,120,280	32,195	31,763,492	5,219,565	60,550,554
1935.....	1,101	6,181	244,237,709	32,755	33,150,704	5,152,971	45,739,144

Clay Products and Other Structural Materials

CLAY PRODUCTS
Brick, Tile and Sewer Pipe

1931.....	171	185	33,159,664	3,131	3,428,142	1,476,870	7,585,310
1932.....	143	159	24,910,020	1,622	1,469,270	569,515	3,405,295
1933.....	141	152	23,760,177	1,195	1,011,747	366,685	2,062,388
1934.....	134	144	22,633,285	1,444	1,165,740	547,347	2,458,826
1935.....	129	136	20,144,431	1,609	1,293,159	606,080	2,127,241

STONEWARE AND POTTERY

1931.....	4	4	659,500	128	113,108	9,568	255,978
1932.....	5	5	437,562	118	107,316	10,288	244,923
1933.....	5	5	451,703	117	90,146	10,636	200,447
1934.....	5	5	413,522	128	97,237	11,385	221,584
1935.....	3	3	357,575	119	94,765	12,915	205,744

TOTAL CLAY PRODUCTS*

1931.....	175	189	33,819,164	3,259	3,541,250	1,486,438	7,841,288
1932.....	148	164	25,347,532	1,740	1,576,586	579,803	3,650,218
1933.....	146	157	24,211,880	1,312	1,101,893	377,321	2,262,835
1934.....	139	149	23,046,807	1,572	1,262,977	558,732	2,630,410
1935.....	132	139	20,502,006	1,723	1,337,924	618,995	2,332,985

OTHER STRUCTURAL MATERIALS†

CEMENT

1931.....	9	12	57,378,436	1,820	2,432,950	3,280,870	15,826,243
1932.....	6	12	55,294,814	1,216	1,344,772	1,701,125	6,930,721
1933.....	6	12	54,403,379	740	781,746	982,087	4,536,935
1934.....	5	11	53,413,000	860	1,009,686	1,206,550	5,667,946
1935.....	4	9	52,454,004	924	1,027,416	1,227,410	3,958,369

*Includes kaolin and other clays.

†A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see Chapter 9.

(c) See footnote at end of table 19.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1931-1935—Concluded

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity for heat and power \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$
<i>OTHER STRUCTURAL MATERIALS—Concluded</i>							
<i>LIME</i>							
1931.....	54	60	7,289,990	799	785,868	612,278	2,764,415
1932.....	53	60	6,823,949	677	575,072	535,433	2,394,537
1933.....	54	60	8,920,042	696	480,833	473,125	2,432,306
1934.....	53	58	8,497,895	737	535,492	606,335	2,745,797
1935.....	49	54	5,707,391	756	556,049	686,186	2,115,354
<i>SANDS AND GRAVEL</i>							
1931.....	704	3,287	8,635,241	3,224	2,878,011	292,892	6,651,165
1932.....	688	4,249	9,542,446	1,743	1,322,201	190,477	4,480,596
1933.....	696	4,598	6,203,113	2,726	1,169,079	129,410	4,464,285
1934.....	794	4,768	4,377,551	1,911	1,236,819	155,194	4,035,477
1935.....	1,398	5,400	4,849,702	3,015	2,479,418	110,300	6,273,377
<i>STONE</i>							
1931.....	300	329	18,860,796	4,198	4,470,699	625,673	11,075,184
1932.....	296	319	16,727,481	2,509	2,051,395	420,581	4,942,211
1933.....	288	317	15,758,198	1,885	1,250,776	283,454	3,000,326
1934.....	354	425	12,983,836	2,087	1,499,272	311,516	4,157,131
1935.....	372	496	12,277,518	2,475	1,950,698	361,756	4,573,224
<i>TOTAL OTHER STRUCTURAL MATERIALS</i>							
1931.....	1,067	3,688	92,164,463	10,041	10,567,588	4,811,713	36,317,007
1932.....	1,043	4,640	88,388,690	6,145	5,293,440	2,847,616	18,748,065
1933.....	1,044	4,987	85,284,732	6,047	3,682,434	1,868,076	14,433,862
1934.....	1,206	5,262	79,272,282	8,595	4,281,269	2,279,595	16,606,361
1935.....	1,823	5,959	75,288,615	7,170	6,013,581	2,385,652	16,920,324
<i>Total Clay Products and Other Structural Materials</i>							
1931.....	1,242	3,877	125,983,627	13,300	14,108,778	6,298,151	44,158,295
1932.....	1,191	4,804	113,736,272	7,885	6,870,026	3,427,419	22,398,283
1933.....	1,190	5,144	109,496,612	7,359	4,784,327	2,245,397	16,696,687
1934.....	1,345	5,411	102,319,089	7,167	5,544,246	2,838,327	19,286,761
1935.....	1,955	6,098	95,790,621	8,898	7,401,505	3,004,647	19,253,309
<i>GRAND TOTAL OF ALL INDUSTRIES</i>							
1931.....	2,395	9,578	842,060,020	72,809	91,969,299	21,509,348	238,170,019
1932.....	2,417	10,380	685,211,573	61,470	71,772,049	16,476,484	196,578,211
1933.....	2,553	10,873	800,292,347	63,334	70,031,805	14,024,904	221,754,818
1934.....	2,986	11,632	831,023,187	73,505	88,126,186	*17,202,492	266,652,847
1935.....	3,657	12,898	777,500,099	80,256	100,080,559	*18,356,832	238,581,268

* See footnote, tables 26 and 27.

(c) The value of fuel, purchased electricity and process supplies used were deducted from the value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value; however, freight and treatment charges on all shipments have been deducted for all years shown. The grand total value of shipments for 1935, comparable with those for previous years and without deductions for fuel, process supplies and electricity totalled \$303,013,184.

Table 21.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1931-1935

Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of fuel and electricity, for heat and power	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
		\$		\$	\$	\$ (*)
NOVA SCOTIA						
1931.....	244	63,853,580	14,871	15,302,444	2,020,666	19,258,296
1932.....	495	63,415,735	13,706	11,302,801	2,047,874	15,049,226
1933.....	595	59,727,371	13,915	9,852,765	2,219,236	15,744,102
1934.....	171	55,799,825	13,500	13,594,114	2,532,500	21,773,899
1935.....	267	53,569,182	14,550	14,301,510	2,527,171	14,207,064
NEW BRUNSWICK						
1931.....	116	5,543,570	1,197	1,048,860	163,893	2,137,832
1932.....	563	4,998,656	1,480	1,123,080	96,922	2,185,174
1933.....	399	5,185,718	1,629	1,402,114	83,493	2,088,331
1934.....	418	5,090,927	1,722	1,276,770	98,213	2,137,835
1935.....	520	4,522,963	2,390	1,865,407	98,089	2,467,339
QUEBEC						
1931.....	2,723	146,067,130	11,141	12,666,586	5,607,812	44,064,907
1932.....	2,487	121,200,895	7,694	8,198,379	4,243,362	32,834,588
1933.....	3,064	127,600,093	8,629	8,621,984	2,953,543	33,888,539
1934.....	3,584	132,819,808	10,362	10,492,169	3,429,003	35,322,932
1935.....	3,850	117,534,858	11,811	12,794,600	3,690,498	33,679,125
ONTARIO						
1931.....	5,409	305,883,585	20,277	30,470,475	7,508,844	98,509,571
1932.....	5,196	244,250,088	16,376	24,412,126	5,447,055	85,868,259
1933.....	5,210	310,789,173	17,306	25,600,168	4,891,054	109,060,404
1934.....	5,527	323,309,378	22,033	32,619,846	6,039,605	140,857,001
1935.....	6,274	322,300,162	25,264	38,152,140	6,581,080	130,220,051
MANITOBA						
1931.....	107	39,113,921	2,059	3,096,332	796,076	15,122,432
1932.....	133	21,349,000	1,730	2,106,017	479,993	11,396,818
1933.....	120	30,130,497	1,379	1,847,251	234,202	8,433,130
1934.....	128	36,329,062	1,948	2,796,454	456,172	8,696,985
1935.....	119	40,944,700	2,346	3,403,649	492,234	9,040,591
SASKATCHEWAN						
1931.....	111	7,136,859	1,092	896,131	222,526	1,876,284
1932.....	115	6,013,271	924	748,782	152,433	1,626,307
1933.....	134	12,368,385	1,265	1,111,001	238,898	2,614,337
1934.....	179	11,107,998	1,461	1,257,282	285,161	3,055,611
1935.....	223	11,390,801	1,457	1,343,041	233,532	2,869,351
ALBERTA						
1931.....	553	141,629,189	10,579	11,357,722	1,198,890	23,021,495
1932.....	567	124,484,909	9,692	10,476,449	804,137	20,701,075
1933.....	575	112,666,472	9,057	9,463,382	805,577	18,945,255
1934.....	588	108,786,069	9,843	9,792,297	888,005	19,056,775
1935.....	585	102,656,116	9,706	10,862,198	926,994	16,738,472

* See footnote, Table 19.

Table 21.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1931-1935—Concluded

Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of fuel and electricity, for heat and power	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
		\$		\$	\$	\$ (b)
BRITISH COLUMBIA						
1931.....	309	127,009,722	11,297	16,345,887	3,874,529	31,925,780
1932.....	819	91,469,101	9,582	12,642,830	3,094,145	25,071,738
1933.....	765	129,665,431	9,845	11,455,946	2,557,066	29,464,365
1934.....	1,043	144,025,741	12,270	15,482,102	3,389,259	34,661,029
1935.....	1,048	118,291,187	12,352	16,479,606	3,731,131	28,172,657
YUKON (a)						
1931.....	6	5,822,464	296	784,862	116,112	2,253,422
1932.....	5	8,029,918	286	761,585	110,563	1,845,026
1933.....	11	12,159,207	309	677,194	41,835	1,516,355
1934.....	14	13,754,379	366	815,152	84,574	1,090,780
1935.....	13	6,290,130	380	878,408	76,103	1,186,593
Canada						
1931.....	9,578	842,060,020	72,809	91,969,299	21,509,348	238,170,019
1932.....	10,380	685,211,573	61,470	71,772,049	16,476,484	196,578,211
1933.....	10,873	800,292,347	63,334	70,031,805	14,024,904	221,754,818
1934.....	11,652	831,023,187	73,505	88,126,186	*17,202,492	266,652,847
1935.....	12,898	777,500,099	80,256	100,080,559	*18,356,832	238,581,243

Plants in provinces do not add to this total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

NOTE.—The increases in column 1 in 1932 for Nova Scotia, New Brunswick and British Columbia were mainly accounted for by more detailed information received from the Provincial Highways Departments on the number of gravel pits in use during the year.

(a) Contains data for the Northwest Territories since 1931.

(b) See footnote, table 19.

* See footnote, tables 26 and 27.

Table 22.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1934 and 1935

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total†	Salaries	Wages	Total
	Male	Female					
1934					\$	\$	\$
Nova Scotia.....	454	60	12,986	13,500	878,799	12,715,315	13,594,114
New Brunswick.....	67	16	1,639	1,722	140,281	1,136,489	1,276,770
Quebec.....	959	80	9,323	10,362	1,609,529	8,882,640	10,492,169
Ontario.....	1,719	261	20,053	22,033	4,213,756	28,406,090	32,619,846
Manitoba.....	190	16	1,742	1,948	374,283	2,422,171	2,796,454
Saskatchewan.....	77	9	1,375	1,461	162,265	1,095,017	1,257,282
Alberta.....	748	88	9,007	9,843	1,612,994	8,179,303	9,792,297
British Columbia.....	1,123	126	11,021	12,270	2,370,216	13,111,886	15,482,102
Yukon.....	32	5	329	366	91,781	723,371	815,152
Canada.....	5,369	661	67,475	73,505	11,453,904	76,672,282	88,126,186
1935							
Nova Scotia.....	520	55	13,975	14,550	965,094	13,336,416	14,301,510
New Brunswick.....	77	18	2,295	2,390	155,807	1,709,600	1,865,407
Quebec.....	901	81	10,829	11,811	1,772,354	11,022,246	12,794,600
Ontario.....	1,969	274	23,021	25,264	4,897,125	33,255,015	38,152,140
Manitoba.....	228	20	2,098	2,346	477,224	2,926,425	3,403,649
Saskatchewan.....	88	4	1,365	1,457	188,891	1,154,150	1,343,041
Alberta.....	779	94	8,833	9,706	1,619,170	9,243,028	10,862,198
British Columbia.....	1,225	134	10,993	12,352	2,496,034	13,983,572	16,479,606
Yukon and N.W.T.....	26	3	351	350	77,586	800,822	878,408
Canada.....	5,813	683	73,760	80,256	12,649,285	87,431,274	100,080,559

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous year, is the sum of these individual averages.

†The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

Table 23.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1934 and 1935

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1934					\$	\$	\$
METAL MINING							
Alluvial Gold Mines.....	48	5	562	615	120,928	906,641	1,027,569
Auriferous Quartz Mines.....	1,518	105	16,139	17,762	3,139,220	24,017,667	27,156,887
Copper-Gold-Silver Mines.....	193	11	2,965	3,169	446,799	4,423,002	4,869,801
Silver-Cobalt Mines.....	29	1	256	286	78,013	283,713	361,726
Silver-Lead-Zinc Mines.....	126	10	1,156	1,292	297,582	1,637,702	1,935,284
Nickel-Copper Mines.....	52	1	2,624	2,677	167,030	4,208,672	4,375,702
Miscellaneous Metal Mines.....	4	1	39	44	6,345	25,928	32,273
Non-ferrous Smelting and Refining.....	737	112	7,449	8,298	1,842,449	9,216,757	11,059,206
NON-METAL MINING, INCLUDING FUELS							
<i>Fuels—</i>							
Coal.....	1,174	116	24,671	25,961	2,579,605	23,082,986	25,662,591
Natural Gas.....	485	135	933	1,553	842,059	947,752	1,789,811
Petroleum.....	129	31	784	944	233,657	838,960	1,072,617
<i>Other Non-Metal Mining—</i>							
Abrasives—natural.....	6	.....	28	34	5,208	15,372	20,580
Asbestos.....	125	22	1,708	1,855	281,493	1,327,319	1,608,812
Feldspar and Quartz.....	37	7	268	312	50,888	154,620	205,508
Gypsum.....	35	4	389	428	59,534	265,197	324,731
Iron Oxides.....	1	1	30	32	3,432	21,548	24,980
Mica.....	2	2	98	102	2,475	47,916	50,391
Salt.....	53	18	398	469	164,685	387,313	551,998
Talc and Soapstone.....	9	2	101	112	26,516	53,195	79,711
Miscellaneous.....	36	9	348	393	79,333	292,429	371,762
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	79	5	776	860	161,118	848,568	1,009,686
Clay Products.....	186	29	1,357	1,572	389,722	873,255	1,262,977
Lime.....	53	9	675	737	82,983	452,509	535,492
Sand and Gravel.....	53	7	1,851	1,911	75,745	1,161,074	1,236,819
Stone.....	199	18	1,870	2,087	317,085	1,182,187	1,499,272
Total.....	5,369	661	67,475	73,505	11,453,904	76,672,282	88,126,186
1935							
METAL MINING							
Alluvial Gold Mines.....	72	11	619	702	151,405	1,076,566	1,227,971
Auriferous Quartz Mines.....	1,612	101	18,121	19,834	3,806,743	27,717,164	31,523,907
Copper-Gold-Silver Mines.....	223	13	3,194	3,430	528,416	4,511,780	5,040,196
Silver-Cobalt Mines.....	38	2	362	402	95,929	398,862	494,791
Silver-Lead-Zinc Mines.....	161	14	1,482	1,657	337,258	2,093,852	2,431,110
Nickel-Copper Mines.....	53	2	3,497	3,552	164,976	5,894,431	6,059,407
Miscellaneous Metal Mines.....	6	3	73	82	12,390	51,222	63,612
Non-ferrous Smelting and Refining.....	817	118	8,009	8,944	2,055,694	10,631,662	12,687,356
NON-METAL MINING, INCLUDING FUELS							
<i>Fuels</i>							
Coal.....	1,258	109	24,831	26,198	2,566,726	24,028,618	26,595,344
Natural Gas.....	524	134	1,061	1,719	862,767	1,070,170	1,932,937
Petroleum.....	125	27	788	940	263,737	782,309	1,046,046
<i>Other Non-Metal Mining</i>							
Abrasives—natural.....	7	.....	35	42	6,740	18,395	25,135
Asbestos.....	127	25	1,920	2,072	302,151	1,601,902	1,904,053
Feldspar and Quartz.....	26	4	230	260	44,385	138,407	182,792
Gypsum.....	49	5	413	467	93,350	273,657	367,007
Iron oxides.....	1	1	30	32	3,472	23,276	26,748
Mica.....	2	1	89	92	2,513	42,704	45,217
Salt.....	71	30	372	473	193,135	404,650	597,785
Talc and Soapstone.....	10	2	82	94	25,662	44,141	69,803
Miscellaneous.....	41	8	317	366	91,736	266,101	357,837
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	74	4	846	924	150,587	876,829	1,027,416
Clay Products.....	198	28	1,502	1,728	374,954	1,012,970	1,387,924
Lime.....	52	9	695	756	84,741	471,308	556,049
Sand and Gravel.....	62	7	2,946	3,015	89,547	2,389,871	2,479,418
Stone.....	204	25	2,246	2,475	340,271	1,610,427	1,950,698
Total.....	5,813	683	73,760	80,256	12,649,285	87,431,274	100,080,559

*See footnote to table 22.

Table 24.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment during 1934 whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	55	38	1	3	11,911	1,058	238	311	89	148	634	132
New Brunswick.....	34	6	33	7	1,493	28	34	150	13	40	688	23
Quebec.....	1,177	137	402	88	4,210	356	227	1,473	173	622	4,559	912
Ontario.....	740	59	580	118	10,721	400	2,155	1,942	307	4,961	1,370	1,504
Manitoba.....	31	22	55	10	803	24	9	296	4	829	64	363
Saskatchewan.....	568	1	.....	7	432	251	11	246	11	183	398	127
Alberta.....	1,580	71	227	232	9,177	26	4	171	4	582	125	53
British Columbia.....	3,403	98	251	101	6,065	122	351	363	37	2,813	21	40
†Yukon.....	.....	.....	.....	.....	38	.....	30	.....	.....	69	7	462
Canada.....	7,588	432	1,549	566	44,850	2,265	3,059	4,952	638	10,247	7,866	3,616
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....	1	.....	132	.....	204	.....	.....	13	25	242	21	478
Auriferous Quartz Mines.....	200	55	389	26	9,656	191	1,569	2,122	50	4,584	214	1,872
Copper-Gold-Silver Mines.....	126	24	27	31	1,787	48	155	355	4	845	3	38
Silver-Cobalt Mines.....	9	.....	.....	.....	188	.....	.....	63	.....	46	.....	22
†Silver-Lead-Zinc Mines.....	.....	.....	.....	.....	1,053	55	30	3	.....	218	130	13
Nickel-Copper Mines.....	5	1	.....	.....	2,128	.....	211	75	4	322	217	25
Miscellaneous Metal Mines.....	1	.....	.....	1	49	12	3	22	.....	3	1	3
Non-ferrous Smelting and Refining..	2,685	21	226	.....	1,685	36	536	257	.....	2,643	126	46
NON-METAL MINING, INCLUDING FUELS—												
Fuels—												
Coal.....	2,318	104	135	68	24,778	1,066	268	314	11	109	418	50
Natural Gas.....	280	13	28	182	175	21	89	267	3	58	188	97
Petroleum.....	393	6	1	2	136	3	.....	35	2	466	59	23
Other Non-metal Mining—												
Abrasives—natural.....	7	1	.....	.....	.....	1	.....	.....	1	47	9	.....
Asbestos.....	634	56	.....	.....	1	.....	.....	.....	.....	.....	1,287	3
Feldspar and Quartz.....	54	.....	.....	.....	39	12	.....	109	2	9	265	10
Gypsum.....	50	3	18	5	271	8	15	32	100	21	117	35
Iron Oxides.....	7	1	.....	.....	2	1	16	.....	1	2	19	.....
Mica.....	4	.....	3	.....	16	50	.....	55	12	13	14	.....
Salt.....	.....	2	1	.....	158	4	11	56	4	32	142	55
Tale and Soapstone.....	5	.....	4	1	.....	.....	.....	.....	.....	22	77	20
Miscellaneous.....	32	.....	2	4	46	1	6	67	35	8	119	218
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	43	15	84	22	460	24	15	64	3	128	118	53
Clay Products.....	301	10	258	137	306	179	91	414	175	164	348	173
Lime.....	35	28	51	9	251	27	.....	80	84	17	2,247	64
Sand and Gravel.....	44	23	22	2	131	289	.....	68	10	63	2,792	104
Stone.....	354	69	167	76	1,330	236	44	481	112	185	935	214
Total.....	7,588	432	1,549	566	44,850	2,265	3,059	4,952	638	10,247	7,866	3,616

†Contains data on mining of silver-pitchblende ores in the Northwest Territories.

Table 25.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment during 1935 whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	2,260	28	38	5	11,624	16	108	306	33	205	987	111
New Brunswick.....	9	.....	52	8	1,354	29	.....	183	.....	18	2,083	85
Quebec.....	628	134	532	247	5,764	364	172	2,068	159	1,612	4,473	1,629
Ontario.....	454	42	376	1,356	16,279	289	1,458	2,118	316	3,075	1,071	1,616
Manitoba.....	112	7	155	12	1,521	43	9	15	3	605	161	151
Saskatchewan.....	355	9	.....	39	527	308	12	79	37	244	574	72
Alberta.....	1,566	103	206	221	9,206	180	37	299	1	545	90	25
British Columbia.....	3,467	219	353	9	7,305	101	365	73	21	2,122	28	12
† Yukon.....	.....	.....	.....	.....	15	20	.....	36	.....	102	14	414
Canada.....	8,851	542	1,712	1,897	53,595	1,350	2,161	5,177	570	8,528	9,491	4,115
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....	2	.....	.....	.....	346	.....	.....	.....	.....	243	10	422
Auriferous Quartz Mines.....	158	16	125	440	11,952	250	1,780	1,352	40	4,283	280	1,881
Copper-Gold-Silver Mines.....	.....	195	.....	9	2,414	.....	.....	244	.....	779	.....	63
Silver-Cobalt Mines.....	2	3	.....	.....	297	.....	2	91	.....	11	3	61
† Silver-Lead-Zinc Mines.....	17	.....	1	.....	1,316	25	34	58	3	508	15	48
Nickel-Copper Mines.....	1	.....	.....	299	3,467	1	.....	164	.....	282	1	42
Miscellaneous Metal Mines.....	4	.....	.....	.....	99	.....	.....	2	.....	3	32	.....
Non-Ferrous Smelting and Refining.....	2,801	9	343	546	4,646	.....	3	225	.....	475	2	648
NON-METAL MINING, INCLUDING FUELS—												
Fuels—												
Coal.....	4,121	111	163	72	24,282	236	90	222	8	466	593	21
Natural gas.....	226	4	43	221	161	12	57	983	6	28	200	148
Petroleum.....	544	.....	5	1	134	26	.....	17	.....	213	91	8
Other Non-metal Mining—												
Abrasives—natural.....	7	.....	.....	.....	15	.....	.....	.....	.....	8	41	1
Asbestos.....	6	.....	69	.....	1,327	.....	.....	166	.....	517	268	11
Feldspar and Quartz.....	34	1	.....	2	77	14	7	36	14	15	178	4
Gypsum.....	81	10	35	12	257	19	24	33	35	19	82	12
Iron Oxides.....	5	1	9	11	3	1	1	.....	.....	1	17	1
Mica.....	2	1	2	.....	36	37	2	55	.....	.....	15	.....
Salt.....	8	1	4	1	149	32	.....	37	.....	42	187	11
Talc and Soapstone.....	7	.....	.....	.....	36	.....	1	4	.....	10	30	12
Miscellaneous.....	54	15	2	1	44	1	10	3	68	82	74	147
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	39	34	246	2	493	5	12	.....	18	88	110	45
Clay Products.....	168	3	289	82	524	248	41	513	137	171	537	212
Lime.....	35	45	74	7	271	4	17	80	70	35	166	72
Sand and Gravel.....	64	24	20	22	226	258	16	143	1	38	5,626	108
Stone.....	465	69	282	169	1,023	181	64	749	170	211	933	137
Total.....	8,851	542	1,712	1,897	53,595	1,350	2,161	5,177	570	8,528	9,491	4,115

† Contains data on mining of silver-pitchblende ores in the Northwest Territories.

Table 26.—Fuel and Electricity Used in the Mineral

Industry	Bituminous coal		Anthracite coal	Lignite coal		Coke
	Canadian	Imported		Canadian	Imported	
	Tons	Tons	Tons	Tons	Tons	Tons
METAL MINING						
Alluvial Gold Mines.....Quantity		31				5
	\$	2,022				504
Auriferous Quartz Mines.....Quantity	14,988	11,550	870	369		269
	\$	133,711	12,654	3,440		4,037
Copper-Gold-Silver Mines.....Quantity	6,843		75			84
	\$	51,804	1,384			1,167
Silver-Cobalt Mines.....Quantity	6	883	133			
	\$	79	2,224			
Silver-Lead-Zinc Mines.....Quantity	27,629	31	3	160		8
	\$	115,669	986	873		66
Nickel-Copper Mines.....Quantity	20	818	3			60
	\$	280	51			819
Miscellaneous Metal Mines.....Quantity						
	\$					
Non-Ferrous Smelting and Refining.....Quantity	3,315	20,131	58			2,371
(See footnote)	\$	15,374	889			25,506
Total.....Quantity	52,801	33,444	1,142	529		2,797
	\$	316,917	244,622	4,313		32,089
NON-METAL MINING, INCLUDING FUELS						
<i>Fuels</i>						
Coal.....Quantity	625,672			97,110		
	\$	1,963,140		91,487		
Natural Gas.....Quantity	979	238		100		5
	\$	7,184	1,903	425		36
Petroleum.....Quantity	1,217					
	\$	5,124				
Total.....Quantity	627,868	238		97,210		5
	\$	1,975,448	1,903	91,912		36
<i>Other Non-Metal Mining</i>						
Abrasives—natural.....Quantity	248					
	\$	1,653				
Asbestos.....Quantity	17,900	14	8,269			110
	\$	120,605	52,756			1,309
Feldspar and Quartz.....Quantity	1,001	1,325				
	\$	7,208	9,057			
Gypsum.....Quantity	4,223	878		687		180
	\$	23,801	5,486	2,404		1,863
Iron Oxides.....Quantity		211	19			
	\$		1,477	295		
Mica.....Quantity						
	\$					
Salt.....Quantity	4,221	39,767		80		
	\$	17,795		247		
Talc and Soapstone.....Quantity	1	192,352				
	\$	9				
Miscellaneous.....Quantity	8,904	631	21	22,331		1
	\$	48,957	2,845	59,660		7
Total.....Quantity	36,498	42,826	8,809	23,098		291
	\$	220,028	211,410	53,283	62,311	3,179
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement.....Quantity	69,853	60,877				
	\$	367,880	330,432			
Clay Products.....Quantity	10,706	49,791	66	547		357
	\$	60,073	317,697	626	2,302	3,010
Lime.....Quantity	29,144	40,156	65	57		10,035
	\$	173,350	194,568	324	189	66,580
Sand and Gravel.....Quantity	3,007	11,481				4
	\$	15,792	63,728			35
Stone.....Quantity	1,364	5,143	518			
	\$	10,476	3,712			
Total.....Quantity	114,074	167,448	649	604		10,396
	\$	627,571	942,477	4,662	2,491	69,625
Grand Total.....Quantity	831,241	243,956	10,100	121,441		13,489
	\$	3,139,964	1,400,412	75,224	161,027	104,929

NOTE.—In addition to the items listed, this Industry consumed for metallurgical purposes 373,362 tons of Canadian bituminous coal valued at \$2,320,909; 50,493 tons of imported bituminous at \$299,398; 261,897 tons of coke at \$2,476,281; 713 gallons of gasoline at \$210; 399 gallons of kerosene at \$89; 9,894,420 gallons of fuel oil at \$554,779; 4,662 cords of wood at \$26,721; 50,418 M cu. ft. of manufactured gas at \$5,848; 411,073,814 K.W.H. of purchased electricity at \$1,197,717, and other fuel valued at \$30,898. For corresponding statistics for preceding years, see previous reports.

Industry in Canada, by Kinds and Industries, 1934

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
30,950	4,747	107,438	4,075						12,351,000
12,450	2,252	17,404	41,979			4		76,615	
348,584	41,310	3,076,092	108,984	30			415,570,129		29,745,373
116,269	8,215	371,662	395,908	466		276	3,091,147	4,249,296	
46,478	5,214	455,032	1,335				91,206,159		32,425,684
13,937	1,230	28,140	3,451			650	440,917	542,670	
1,208	40	4,118	1,457				5,276,797		
331	9	671	2,717			16,954	50,439	85,685	
21,544	238	382,123	762				37,600,307		16,286,150
20,299	125	58,167	7,408				185,606	389,276	
3,858	1,718	92,814	2,449				61,074,384		1,336,119
1,027	374	8,968	6,573				211,080	233,963	
795	10	180	410				29,734		
227	2	32	1,230				892	2,383	
47,393	7,089	2,741,880	69	92,035	152		1,077,755,407		20,251,795
10,133	1,539	121,952	344	11,320	122	8,852	3,255,630	3,564,712	
500,810	60,366	6,859,677	119,541	92,065	152		1,688,512,917		112,396,121
174,673	13,746	606,996	459,610	11,786	122	26,736	7,235,711	9,144,600	
49,660	4,299	4,570					105,530,072		41,315,731
12,525	1,028	617					1,379,990	3,448,787	
44,908	40	8,861	72		114,401		23,899		
10,000	6	518	288		46,565		416	67,341	
13,890	416	16,251	750		1,867,580		1,749,478		
3,054	49	4,268	2,250		129,446		24,147	168,338	
108,458	4,755	29,682	822		1,981,981		107,303,449		41,315,731
25,579	1,083	5,403	2,538		176,011		1,404,553	3,684,466	
3,500			40						
850			113					2,616	
29,226	3,664	6,580					67,564,991		
5,556	593	750					673,994	855,556	
30,715	356	104,183	504				452,272		900,000
7,627	78	9,355	1,090				11,439	45,854	
59,979	400	76,252	537	192	17,197		2,912,953		907,492
19,822	95	5,471	2,148	1,098	6,883	59	49,430	118,560	
			664				86,154		
			5,314				2,584	9,670	
162		58							126,329
42		8						50	
3,695	258	113,098	2,774				595,420		6,269,620
899	73	10,881	7,920				6,090	236,257	
7,042	100	720	31				1,428,653		
1,602	20	82	107				24,492	26,312	
25,487		1,611,003	1,154	37,245			1,927,711		1,323,750
5,741		96,578	4,243	3,501		20	18,440	240,224	
159,806	4,778	1,911,894	5,704	37,487	17,197		74,968,154		9,527,191
41,959	859	123,125	20,985	4,599	6,883	79	780,469	1,535,099	
69,890	907	145					48,457,250		
11,908	170	22					496,138	1,206,550	
25,735	650	16,115	19,212	212	412,024		4,679,491		75,540
5,723	106	1,990	71,075	997	8,792	57	86,284	558,732	
7,738	35	327,454	39,467		1,450		6,241,560		342,167
1,492	7	15,230	113,220		840		40,535	606,335	
64,933	107		7		50		2,447,727		150,000
12,832	21		39		30	909	61,808	155,194	
183,764	2,241	100,506	2,955				15,840,918		231,245
39,929	282	9,287	9,186			1,326	201,266	311,516	
352,060	3,940	444,221	61,641	212	413,524		77,666,946		798,952
71,884	586	26,529	193,520	997	9,662	2,292	886,031	2,838,327	
1,121,134	73,839	9,245,474	187,708	129,714	2,412,854		1,948,451,466		164,037,995
314,075	16,274	762,053	676,603	17,382	192,678	29,107	10,312,764	17,202,492	

Table 27.—Fuel and Electricity Used in the Mineral

Industry	Bituminous coal		Anthracite coal		Lignite coal		Coke
	Canadian	Imported	From United States	Other	Canadian	Imported	
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
METAL MINING							
Alluvial Gold Mines.....	Quantity 2	20					7
	\$ 231	399					719
Auriferous Quartz Mines.....	Quantity 8,958	19,370	1,136	517			267
	\$ 75,665	185,267	12,046	9,426			3,976
Copper-Gold-Silver Mines.....	Quantity 3,392	78	71				82
	\$ 26,884	949	1,334				1,136
Silver-Cobalt Mines.....	Quantity 448	704	139	322			8
	\$ 4,177	11,066	1,917	4,338			60
Silver-Lead-Zinc Mines.....	Quantity 30,111	1			181		17
	\$ 128,068	485			1,084		137
Nickel-Copper Mines.....	Quantity 1,033	1,751	37	59	35		176
	\$ 6,427	10,958	523	995	372		2,385
Miscellaneous Metal Mines.....	Quantity 4						
	\$ 28						
Non-Ferrous Smelting and Refining..	Quantity 8,226	23,165	70		20		2,167
(See footnote)	\$ 40,146	143,050	1,148		205		22,782
Total.....	Quantity 52,174	45,089	1,453	895	236		2,724
	\$ 281,626	352,174	16,968	14,759	1,661		31,195
NON-METAL MINING, INCLUDING FUELS							
<i>Fuels</i>							
Coal.....	Quantity 623,060				82,891		
	\$ 1,911,601				78,632		
Natural Gas.....	Quantity 170	263			300		9
	\$ 1,272	2,173			1,200		134
Petroleum.....	Quantity 1,634				944		
	\$ 7,172				2,266		
Total.....	Quantity 624,864	263			84,135		9
	\$ 1,920,045	2,173			82,098		134
<i>Other Non-Metal Mining</i>							
Abrasives—natural.....	Quantity 295						
	\$ 2,061						
Asbestos.....	Quantity 22,598		8,560	1,781			100
	\$ 152,116		59,472	10,844			1,193
Feldspar and Quartz.....	Quantity 553	1,207					34
	\$ 3,596	7,937					383
Gypsum.....	Quantity 4,182	900			44		289
	\$ 24,566	5,799			407		2,564
Iron Oxides.....	Quantity 1,037	244		11			
	\$ 9,997	1,708		170			
Mica.....	Quantity 2,573	23,252					
	\$ 9,997	111,964		3,483	2,305		
Talc and Soapstone.....	Quantity 163			16,824	9,136		
	\$ 1,037			39			
Miscellaneous.....	Quantity 9,521	943	10	244			
	\$ 55,730	4,527	150	2	16,010		1
Total.....	Quantity 39,885	26,546	8,570	5,316	18,359		424
	\$ 249,103	131,935	59,622	28,112	49,019		4,149
STRUCTURAL MATERIALS AND CLAY PRODUCTS							
Cement.....	Quantity 78,477	53,338					
	\$ 433,347	291,741					
Clay Products.....	Quantity 16,812	48,006	230	99	2,055		407
	\$ 99,020	311,220	1,183	686	4,939		3,670
Lime.....	Quantity 30,889	48,383	103		66		9,902
	\$ 182,306	248,387	601		247		69,224
Sand and Gravel.....	Quantity 3,578	4,739	390				3
	\$ 21,589	29,243	2,015				30
Stone.....	Quantity 4,799	3,290	679		102		
	\$ 39,229	23,108	4,882		678		
Total.....	Quantity 134,555	157,756	1,402	99	2,223		10,312
	\$ 775,491	903,699	8,681	686	5,864		72,924
Grand Total.....	Quantity 851,478	229,654	11,425	6,313	104,953		13,469
	\$ 3,226,265	1,389,981	85,271	43,557	138,642		108,402

NOTE.—In addition to the items listed this Industry consumed for metallurgical purposes, 389,978 tons of Canadian bituminous coal valued at \$2,455,340; 99,086 tons of imported bituminous at \$553,355; 46 tons of American Anthracite valued at \$334; 255,916 tons of coke at \$2,464,933; 609 gallons of gasoline at \$181; 11,518,943 gallons fuel oil at \$610,359; 8,800 cords wood at \$61,347; 44,386 Mcu.ft. of manufactured gas at \$5,000; 577,944,639 k.w.h. of purchased electricity at \$1,312,181 and other fuel valued at \$3,287, and 4,282,499 k.w.h. electricity generated for own use.

Industry in Canada, by Kinds and Industries, 1935

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Process Supplies
				Manufactured	Natural					
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	\$
24,998	1,495	70,236	5,534						13,525,810	
12,263	956	10,125	45,839			2		70,534		21,203
380,658	29,870	3,139,542	102,749	144		539	464,146,582	5,002,274	36,215,740	11,591,757
116,702	7,070	433,153	434,637	1,630			3,722,163		34,494,941	2,899,132
40,943	2,682	317,724	972				92,936,681	534,152		
12,093	760	19,621	4,162				467,213			
2,017	25	7,818	1,159				5,489,117			
620	6	1,657	4,886			27,772	57,940	114,439		131,779
22,737	524	334,990	1,346				50,698,860		6,740,962	
18,075	237	50,210	12,295				226,935	438,126		767,696
15,515	1,982	119,198	1,406				74,487,008		575,120	
3,801	427	11,515	3,959				217,895	259,257		3,202,375
			575				200,000			
			1,743				2,280	4,051		5,249
61,556	5,728	3,241,265	204	61,674	131		1,054,483,080		18,600,918	
11,501	1,247	130,583	1,482	8,186	107	7,489	3,408,455	3,776,351		7,479,978
548,424	42,306	7,230,773	113,945	61,818	131		1,742,441,278		110,153,491	
175,655	10,703	656,864	509,003	9,816	107	35,802	8,102,881	10,199,214		26,099,169
49,269	3,764	5,146					103,586,226		39,263,652	
12,729	916	705					1,400,173	3,404,756		9,446,877
36,027		5,021			129,249		12,854			
8,171		313			52,588		242	66,093		149,825
10,881	825	5,583	554		1,695,738		1,837,973			
2,286	110	1,457	1,674		120,784		25,029	160,678		647,822
96,177	4,589	15,750	554		1,824,987		105,437,053		39,263,652	
23,186	1,086	2,475	1,674		173,372		1,425,444	3,631,527		10,244,584
947		7,500	146				14,900		40,000	
223		900	638				298	4,120		2,206
27,745	4,004	6,633	10				72,825,928			
5,934	771	716	40				692,397	923,483		1,134,968
20,456	658	139,405	454				489,780		936,100	
4,745	160	12,571	1,372				10,791	41,555		16,457
57,985	470	103,913	2,118		20,748		2,656,014		494,657	
15,140	104	6,017	8,137		8,302		50,578	121,614		65,413
100	85		1,454				85,638			
25	21		7,761				2,569	12,254		10
709			20						189,500	
277			70					347		348
300	222	134,906	2,352				661,944		3,871,365	
96	62	12,338	6,991				7,832	175,240		38,700
3,060	80	2,080	20				1,573,767			
643	16	237	50				21,547	23,774		13,637
47,403	792	1,377,925	1,733	87,410			2,029,225		1,569,321	
9,209	177	75,484	6,573	8,652		602	18,438	219,057		35,891
158,705	6,311	1,772,362	3,307	87,410	20,748		80,337,196		7,100,943	
36,292	1,311	108,263	31,632	8,652	3,302	602	804,450	1,521,444		1,307,680
35,125	1,564	12,032					51,958,859		86,303	
6,048	290	1,446					494,538	1,227,410		394,264
24,181	1,825	15,998	24,042	17	743,697		6,628,367		209,932	
6,200	403	1,985	86,302	62	11,459	30	91,836	618,995		60,583
15,235	24	333,759	40,784				7,537,151		919,163	
3,328	7	14,969	120,236				46,881	686,186		124,251
65,971	3,736	2,410	53		5,535		2,005,582			
14,801	578	253	181		2,227	1,391	37,992	110,300		5,763
176,008	3,189	67,622	3,679				17,180,620		339,250	
36,898	590	6,949	10,543			8,784	230,095	361,756		372,583
316,520	10,338	431,821	68,558	17	749,232		85,310,579		1,554,648	
67,275	1,868	25,662	217,262	62	13,686	10,205	901,342	3,004,647		957,444
1,119,826	63,544	9,450,706	191,364	149,245	2,595,098		2,013,526,106		158,072,734	
302,408	14,908	793,204	759,471	18,530	195,467	46,609	11,234,117	18,356,832		38,608,767

Table 28.—Fuel and Electricity Used in the Mineral

Province	Bituminous coal		Anthracite coal	Lignite coal		Coke
	Canadian	Imported		Canadian	Imported	
	Tons	Tons	Tons	Tons	Tons	Tons
Nova Scotia..... Quantity	410,120	154	6			2,640
\$	1,429,427	1,746	91			15,115
New Brunswick..... Quantity	6,011	8				
\$	27,040	130				
Quebec..... Quantity	101,672	28,184	8,903			2,540
\$	581,346	176,722	58,049			19,918
Ontario..... Quantity	19,670	213,783	1,123	68		7,546
\$	147,678	1,200,408	15,285	465		59,231
Manitoba..... Quantity	11,997	1,738		799		57
\$	96,597	17,437		2,678		964
Saskatchewan..... Quantity	3,491			54,126		12
\$	23,966			93,575		190
Alberta..... Quantity	126,363			65,686		
\$	352,173			58,930		
British Columbia..... Quantity	151,894	57	68	762		689
\$	481,668	1,411	1,799	5,379		9,007
Yukon..... Quantity	23	32				5
\$	69	2,558				504
Canada..... Quantity	831,241	243,956	10,100	121,441		13,489
\$	3,139,964	1,400,412	75,224	161,027		104,929

*See footnote, table 26.

Table 29.—Fuel and Electricity Used in the Mineral

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke	Gasolene
	Canadian	Imported	From United States	From other Countries			
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.
Nova Scotia..... Quantity	410,671	49				2,847	95,208
\$	1,402,591	375				16,114	25,438
New Brunswick..... Quantity	6,566	9					18,898
\$	30,388	156					4,201
Quebec..... Quantity	111,151	17,542	9,309	1,925		1,483	292,684
\$	648,600	126,513	64,509	12,808		14,710	70,410
Ontario..... Quantity	15,492	211,041	1,887	4,355	145	8,464	449,508
\$	120,323	1,248,655	17,395	30,501	1,177	68,531	107,017
Manitoba..... Quantity	15,428	852		33	2,251	46	55,347
\$	118,507	8,684		248	7,764	592	19,687
Saskatchewan..... Quantity	2,212	3			48,231	8	45,412
\$	14,748	138			77,541	125	12,011
Alberta..... Quantity	132,313				54,038		21,384
\$	374,304				50,347		6,097
British Columbia..... Quantity	157,624	137	229		288	614	120,350
\$	516,226	4,576	3,367		1,813	7,611	37,081
Yukon and N.W.T..... Quantity	21	21				7	21,035
\$	578	884				719	20,466
Canada..... Quantity	851,478	229,654	11,425	6,313	104,953	13,469	1,119,826
\$	3,226,265	1,389,981	85,271	43,557	138,642	108,402	302,408

* See footnote, table 27.

Industry in Canada, by Provinces, 1934*

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu.ft	M cu.ft	\$	K.W.H.	\$	K.W.H.
75,779 23,356	817 202	121,659 13,638	2,249 7,190	37,245 3,501		59	78,175,417 1,038,175		15,397,214
9,198 1,995		9,501 546	9,927 32,360		20,304 8,526		853,149 27,616		98,213
312,615 78,332	15,080 2,886	2,196,565 163,319	59,935 192,209			1,346	339,764,104 2,154,876		10,473,633
441,057 100,948	18,628 4,796	1,007,167 140,179	70,795 237,820	242 1,463	119,631 49,342	17,506	655,437,825 4,064,484		18,398,231
49,001 24,604	2,399 750	53,177 14,114	23,618 113,597	192 1,098		520	171,555,944 183,813		68,480
46,440 11,017	634 161	1,622,604 98,106	26 131			130	41,551,413 57,885		1,861,690
29,484 8,300	4,327 1,034	30,703 5,721	1,550 5,662		2,272,919 134,810		21,437,899 321,375		9,296,146
137,548 44,195	29,881 4,987	4,167,349 310,762	16,026 44,645	92,035 11,320		9,546	639,675,715 2,464,540		96,616,601
20,012 21,328	2,073 1,458	36,749 15,668	3,582 42,989						11,926,000
1,121,134 314,075	73,839 16,274	9,245,474 762,053	187,708 676,603	129,714 17,382	2,412,854 192,678	29,107	1,948,451,466 10,312,764		164,037,995

Industry in Canada, by Provinces, 1935*

Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Process Supplies
			Manufactured	Natural					
Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	\$
3,030 464	197,522 21,601	3,598 11,972	87,410 8,652			75,926,704 1,039,964		19,083,988	
	4,196 210	9,458 29,239		15,306 7,018		1,170,973 26,877		98,089	
14,035 2,736	2,292,082 178,000	55,284 183,197				392,165,132 2,388,637		13,965,010	
21,932 5,027	987,913 156,626	69,965 296,708	462 2,269	149,718 60,178	29,724	763,896,973 4,436,949		16,379,535	
5,166 1,537	123,446 28,975	26,924 118,489	17 62		8,777	60,810,764 178,912		2,227,779	
1,222 293	1,389,543 77,607	950 3,036				12,069,136 48,033		2,071,902	
5,325 1,275	6,308 811	1,064 3,678		2,430,074 128,271		24,011,014 362,211		11,917,449	
11,513 2,636	4,422,127 316,964	21,131 73,046	61,356 7,547		7,730	683,475,410 2,762,534		79,226,261	
1,321 940	27,569 12,410	2,990 40,106						13,200,810	
63,544 14,908	9,450,706 793,204	191,364 759,471	149,245 18,530	2,595,098 195,467	46,609	2,012,526,106 11,231,117		158,072,734	

DOMINION BUREAU OF STATISTICS

Table 30.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia.....No.	72	17	62	1	152	686	838	213	144
H.P.	55,679	2,564	2,325	35	60,603	50,385	110,988	8,128	35,820
New Brunswick.....No.	23		38		61	123	184		30
H.P.	1,638		1,120		2,758	1,860	4,618		1,514
Quebec.....No.	67	25	123	4	219	3,544	3,763	316	123
H.P.	6,399	3,415	4,908	1,105	16,827	135,936	151,763	5,872	13,278
Ontario.....No.	193	33	358	9	593	6,334	6,927	748	208
H.P.	11,651	3,652	11,235	1,260	27,798	265,980	293,778	10,429	25,856
Manitoba.....No.	26	10	41	1	78	1,274	1,352	83	35
H.P.	845	1,025	1,035	1,900	4,805	53,922	58,727	2,159	3,705
Saskatchewan.....No.	43	5	33		81	361	442	217	20
H.P.	2,820	900	924		4,644	13,261	17,905	2,531	2,556
Alberta.....No.	197	5	76		278	1,042	1,320	377	230
H.P.	27,734	95	1,962		29,791	34,080	63,871	10,514	27,127
British Columbia.....No.	130	85	98	95	408	3,107	3,515	1,232	154
H.P.	34,133	9,556	2,206	46,770	92,666	157,758	250,423	45,518	27,385
Yukon and N.W.T.....No.	13	2	16	2	33		33	112	12
H.P.	430	250	234	10,000	10,914		10,914	6,028	332
Canada.....No.	764	182	845	112	1,903	16,471	18,374	3,298	956
H.P.	141,329	21,457	25,949	61,070	249,805	713,182	962,987	91,179	137,573

Table 31.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold									
Mines.....No.	10	4	15	5	34		34	123	14
H.P.	260	647	256	10,025	11,188		11,188	6,539	379
Auriferous Quartz									
Mines.....No.	66	108	144	24	342	4,071	4,413	563	190
H.P.	3,398	13,688	4,125	11,770	32,981	142,327	175,308	10,577	14,369
Copper-Gold-Silver									
Mines.....No.	1		1	7	9	1,440	1,449	258	5
H.P.	3,500		5	9,300	12,805	62,442	75,247	11,280	408
Silver-Cobalt									
Mines.....No.		1	2		3	43	46		4
H.P.		115	9		124	1,743	1,867		290
Silver-Lead-Zinc									
Mines.....No.	7	26	22	39	94	443	537	338	19
H.P.	6,195	2,678	513	1,775	11,161	14,244	25,405	7,703	3,114
Nickel-Copper									
Mines.....No.	1		2	2	5	370	375	9	3
H.P.	80		87	720	887	27,464	28,351	766	243
Miscellaneous Metal									
Mines.....No.	2				2	3	5		2
H.P.	125				125	130	255		125
Non-ferrous Smelting and Refining.....No.	22		14	10	46	4,390	4,436	841	51
H.P.	12,136		483	14,035	26,654	223,161	249,815	16,492	25,001
Total.....No.	109	139	200	87	535	10,760	11,295	2,132	288
H.P.	25,694	17,128	5,478	47,625	95,925	471,511	567,436	53,357	43,929
NON-METAL MINING, INCLUDING FUELS—									
Fuels									
Coal.....No.	364	1	82	2	449	1,763	2,212	631	383
H.P.	99,462	75	1,410	12,000	112,947	81,066	194,013	29,893	69,722
Natural Gas.....No.	15		197		212	25	237	13	11
H.P.	450		5,362		5,812	674	6,486	202	445
Petroleum.....No.	27		63		90	91	181	37	59
H.P.	1,886		1,963		3,849	599	4,448	812	5,090
Total.....No.	406	1	342	2	751	1,879	2,630	681	463
H.P.	101,798	75	8,735	12,000	122,608	82,339	204,947	30,907	75,257

Reserve or Idle, in the Mineral Industry in Canada, by Provinces, 1935

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
12	5	14		31	15	46	8	9
1,023	94	348		1,466	223	1,688	337	861
7		1		8	3	11	4	1
188		30		218	90	308	50	25
32	8	36		76	205	281	22	39
834	571	1,597		3,002	10,669	13,671	397	2,313
46	13	44		103	528	631	59	45
6,263	1,659	3,182		11,104	27,804	38,908	1,477	4,670
16		27		43	41	84	1	23
3,295		2,006		5,301	1,081	6,382	46	2,335
8	1	9		18	6	24	6	4
1,480	225	428		2,133	152	2,285	63	490
40		21		61	3	64	1	23
6,325		251		6,676	58	6,634	35	2,190
11	24	10	19	64	453	517	73	38
1,700	2,193	207	1,925	6,025	12,162	18,187	1,432	4,365
3	4	7	3	17		17		
34	690	175	15,000	15,899		15,899	226	
175	55	169	22	421	1,254	1,675	184	182
21,142	5,432	8,224	16,925	51,723	52,239	103,962	4,063	17,249

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1935

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
2	1	4	3	10		10		2
24	20	79	15,000	15,123		15,123		50
47	20	69	9	145	214	359	43	63
1,763	2,552	4,679	1,375	10,869	9,630	19,999	1,238	4,391
		3		3	20	23		2
		190		190	787	977		135
4				4	2	6	1	3
295				295	26	321	75	180
4	12	8	3	27	99	126	65	5
160	1,651	173	240	2,824	3,766	5,990	1,028	450
					86	86	3	1
					5,158	5,158	130	90
					10	10		
					145	145		
17		25		42	595	637	38	9
7,695		1,800		9,495	23,537	33,032	657	2,825
74	33	109	15	231	1,026	1,257	150	85
9,937	4,223	6,921	16,615	37,696	43,049	80,745	3,128	8,121
50		8		58	23	81	8	38
8,119		134		8,253	360	8,613	375	4,840
1		4		5		5		1
35		123		158		158		45
12		13		25	8	33		16
631		45		676	36	712		1,595
63		25		88	31	119	8	55
8,786		302		9,087	396	9,483	375	6,480

Table 31.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
NON-METAL MINING, INCLUDING FUELS—Cone.									
<i>Other Non-Metal Mining</i>									
Abrasives—natural No.	3	.....	1	.....	4	4	8	30	3
H.P.	160	.....	4	.....	164	80	244	245	180
Asbestos..... No.	6	.....	1	.....	7	760	767	.....	3
H.P.	210	.....	6	.....	216	41,465	41,681	.....	800
Feldspar and Quartz..... No.	5	3	21	.....	29	25	54	50	10
H.P.	445	415	775	.....	1,635	587	2,222	382	705
Gypsum..... No.	5	3	39	.....	47	227	274	22	7
H.P.	778	525	2,002	.....	3,306	6,229	9,534	660	810
Iron oxides..... No.	.....	.....	1	.....	1	6	7	.....	1
H.P.	.....	.....	5	.....	5	81	86	.....	30
Mica..... No.	.....	.....	2	1	3	.....	3	3	1
H.P.	.....	.....	67	145	212	.....	212	115	50
Salt..... No.	28	4	.....	.....	32	37	69	157	11
H.P.	2,345	567	.....	.....	2,912	376	3,288	1,807	3,630
Talc and Soap-stone..... No.	.....	1	7	.....	8	21	29	.....	1
H.P.	.....	25	60	.....	85	708	793	.....	80
†Miscellaneous..... No.	3	3	17	3	26	66	92	134	7
H.P.	570	660	898	240	2,368	2,280	4,648	1,502	667
Total..... No.	50	14	89	4	157	1,146	1,503	396	44
H.P.	4,508	2,192	3,817	385	10,902	51,806	62,708	4,711	6,952
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement..... No.	3	2	32	.....	37	976	1,013	10	15
H.P.	113	516	1,214	.....	1,843	56,833	58,676	756	587
Clay Products..... No.	91	7	34	.....	132	509	641	16	64
H.P.	4,978	305	881	.....	6,164	17,683	23,847	119	6,052
Lime..... No.	16	3	14	1	34	246	280	43	19
H.P.	580	329	339	20	1,268	4,896	6,164	566	1,523
Sand and Gravel..... No.	12	.....	29	7	48	168	216	.....	9
H.P.	581	.....	1,561	240	2,382	4,928	7,310	.....	382
Stone..... No.	77	16	105	11	209	787	996	20	64
H.P.	3,077	912	3,924	800	8,713	23,186	31,899	763	2,891
Total..... No.	199	28	214	19	460	2,686	3,146	89	171
H.P.	9,329	2,062	7,919	1,060	20,370	107,526	127,896	2,204	11,435
Grand total 1935... No.	764	182	845	112	1,903	16,471	18,374	3,298	956
H.P.	141,329	21,457	25,949	61,070	249,805	713,182	962,987	91,179	137,573
Grand total 1934... No.	750	297	748	94	1,889	16,007	17,896	2,671	982
H.P.	150,807	21,873	23,747	53,935	250,362	715,301	965,663	82,645	140,170

† Includes data for peat.

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1935 (concluded)

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
1				1		1	2	
22				22		22	25	
		2		2	36	38		4
		9		9	3,102	3,111		300
1		2		3		3		2
20		23		43		43		50
5		5		10	25	35	9	4
298		148		446	535	981	187	455
		1		1		1		
2	3			6	1	6	1	5
35	55			90	40	130	50	485
		1		1		1		
		16		16		16		
2	1			3		3	6	
310	225			535		535	63	
11	4	11		26	62	88	18	15
685	280	197		1,162	3,677	4,839	385	1,290
1	1	2		4	26	30		
500	250	282		1,032	626	1,658		
6	1	10		17	17	34	1	4
201	7	195		403	447	850	100	205
	7	4		11	19	30	1	2
	299	58		357	662	1,019	8	120
5		2		7	35	42	1	2
240		80		320	2,270	2,590	20	60
15	9	6	7	37	38	75	5	19
794	373	189	310	1,666	1,112	2,778	107	973
27	18	24	7	76	135	211	8	27
1,735	929	804	310	3,778	5,117	8,895	235	1,358
175	55	169	22	421	1,254	1,675	184	182
21,142	5,432	8,224	16,925	51,723	52,239	103,962	4,063	17,249
124	32	95	6	257	968	1,225	255	146
10,395	4,734	4,496	910	20,535	32,569	53,104	10,252	14,866

Table 32.—Mining Accidents in 1935

Cause of Accident	Nova Scotia		New Brunswick		Quebec		Ontario		Saskatchewan		Alberta		British Columbia		Canada	
	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal
UNDERGROUND—																
Falls of roof or face.....	9	430	1	37	3	67	11	199	35	8	57	6	328	38	1,153	
Mine cars and locomotives.....	3	310	...	38	...	53	1	52	37	6	43	5	133	15	666	
Gas and dust explosions.....	7	5	...	1	...	...	...	...	3	17	6	...	1	24	16	
Explosives.....	...	3	...	2	2	16	4	11	...	...	6	4	11	10	49	
Electricity.....	1	...	...	1	...	...	...	2	1	2	1	6	...	2	3	11
Miscellaneous.....	...	535	...	61	5	121	9	1,094	1	107	...	33	5	650	20	2,601
Total.....	20	1,283	1	140	10	257	25	1,356	2	184	32	151	20	1,125	110	4,496
SURFACE—																
Haulage.....	...	38	...	5	...	90	1	25	7	1	2	...	22	2	189	
Machinery.....	...	12	...	5	1	77	3	63	10	...	5	...	17	4	189	
Miscellaneous.....	...	157	...	14	6	242	2	604	55	2	21	...	423	10	1,516	
Total.....	...	207	...	24	7	409	6	692	...	72	3	28	...	462	16	1,894
Grand Total.....	20	1,490	1	164	17	666	31	2,048	2	256	35	179	20	1,587	126	6,390

Table 33.—Purchases of Mining and Milling Equipment, General Supplies, and Freight with comparative

	Nova Scotia
	\$
Belting of all kinds, including elevator, conveyor, transmission, etc., and fasteners for same.....	29,382
Bolts, nuts, rivets, studs, washers, coach, set and machine screws, etc.....	58,871
Castings—unfinished iron and steel.....	37,361
Unfinished brass castings; brass and copper rods and sheets, babbitt and non-ferrous metals of all kinds..	20,862
Cars and locomotives and mechanical parts for same.....	4,301
Track materials—rails and fittings, switches, spikes, bolts, etc.....	137,761
Explosives—powder, fuses and detonators.....	256,469
Rock drills and parts.....	24,527
Drills and tool steels.....	7,681
Pipe and fittings, plumbing supplies and valves.....	208,583
Iron and steel bars, sheets, plates, and all structural steel.....	134,060
Wire rope and fittings.....	168,053
Diamonds and bort for drilling.....	
Safety equipment and apparel—safety hats, boots, gloves, respirators, etc.; miners' lamps and lamp rentals	66,762
Fuel: coal, coke, charcoal and wood.....	61,069
Fuel oil, kerosene and gasoline.....	63,415
Lubricants: oil, grease and waste.....	93,342
Lumber and timber of all kinds.....	618,700
Building materials—cement, brick, tile, roofing and building paper, building hardware, sand, lime and miscellaneous.....	95,784
Electrical equipment and supplies—motors, batteries, wire and cable, etc.....	191,354
Crushing, grinding and screening machinery and parts—ball and tube mill liners, roll shells, etc.....	21,821
Filter cloth, rotor covers and ore dressing blankets.....	160
Balls and rods for grinding.....	2,381
Machinery, mill, n.o.p., and parts.....	10,325
Machinery, mine, n.o.p., and parts—steel shop equipment, hoists, mine pumps, etc.....	95,503
Machinery, smelter, n.o.p., and parts.....	
Machinery, miscellaneous, and parts—machine, blacksmith, carpenter shop and general surface equipment	59,301
Motor cars, trucks and accessories.....	17,649
Tools—brooms, picks, shovels, hammers, handles, saws, wrenches, machinists' tools, etc.....	22,673
Welding and cutting equipment and accessories—oxygen, acetylene welding, rods, tips, etc.....	21,692
Rubber goods, suits, boots, hose and accessories, pump valves, launder linings, etc. (not including belts)..	16,796
Flotation reagents.....	10,938
Cyanide and cyanide plant chemicals.....	22
Acids and chemicals, n.o.p.....	2,708
Refractories—brick, cement, fireclay, etc.....	19,110
Smelter fluxes—fluorspar, limestone, quartz, sand, etc.....	18,023
Hospital equipment and medical supplies.....	3,734
Stationery, office equipment and supplies, survey and drafting equipment and supplies.....	32,544
Miscellaneous materials, n.o.p. Includes all materials NOT OTHERWISE PROVIDED FOR in any other line.....	198,337
Power—electric.....	£80,947
Freight (a) incoming—only amounts paid direct to railway company.....	236,047
(b) outgoing.....	
Express (a) incoming—only amounts paid direct to express company.....	104,275
(b) outgoing.....	34,641
Insurance (a) Fire.....	91
(b) Sickness and accident.....	50,233
(c) Group.....	
(d) Workmen's compensation.....	2,697
(e) Bullion.....	364,480
(f) Other.....	224
	18,150
Added items for COAL MINING INDUSTRY—	
Railway locomotives and rolling stock.....	339,031
Underground mine cars.....	216,480
Coal cutting machinery and parts.....	184,374
Horses and horse-keep (including the purchase of horses, oats, hay, mixed feeds, harness, etc.).....	112,961
Ground limestone for dusting.....	50,706
Total.....	5,527,391
Comparative Totals for 1934.....	5,488,030

*Since the operations of one large mining and smelting company are conducted on the interprovincial boundary, it was necessary to combine the statistics for Manitoba and Saskatchewan.

and Insurance Expenditures, by the Entire Canadian Mining Industry in 1935,
totals for 1934

New Brunswick	Quebec	Ontario	Manitoba and* Saskatchewan	Alberta	British Columbia and Yukon	Canada
\$	\$	\$	\$	\$	\$	\$
555	88,951	127,646	35,771	8,136	61,062	351,503
1,028	321,866	122,368	21,579	12,986	61,896	600,594
146	37,063	158,361	18,715	12,231	99,499	363,376
82	29,183	91,728	31,418	4,049	136,323	313,645
3,519	73,940	377,570	67,170	16,116	86,445	629,061
2,214	60,500	291,228	34,710	31,353	75,503	633,269
17,847	821,473	2,925,791	443,499	147,903	937,235	5,550,217
653	202,057	680,639	128,636	38,747	160,210	1,235,469
199	125,914	487,159	78,719	3,141	94,597	797,410
761	241,682	1,369,811	150,238	158,635	272,209	2,401,919
721	214,292	1,040,630	198,347	78,056	262,838	1,928,944
591	70,227	273,395	55,429	34,403	58,086	660,184
.....	16,876	117,470	7,965	2,162	8,650	153,123
4,012	28,358	151,865	17,199	16,013	39,235	323,444
30,723	1,517,405	4,659,239	306,527	88,318	748,795	7,412,076
3,363	353,651	742,903	221,129	43,490	424,190	1,852,141
3,006	105,445	241,255	60,528	76,517	115,542	695,665
51,157	298,818	3,093,373	164,683	326,993	497,363	5,051,087
4,861	260,376	782,870	99,881	61,884	235,067	1,540,723
3,677	474,611	1,082,058	420,884	93,155	348,526	2,614,265
543	351,076	745,879	198,173	10,951	163,440	1,491,883
.....	21,517	137,279	11,951	183	42,078	213,168
.....	252,298	780,642	64,599	.....	143,571	1,243,491
1,510	647,643	685,093	116,705	4,048	213,188	1,678,512
19,447	386,868	851,975	223,203	44,409	293,414	1,914,819
3	92,223	521,152	21,702	.....	148,554	783,634
3,064	163,604	416,295	136,572	204,364	225,136	1,208,336
657	52,715	149,651	85,929	32,846	113,474	452,921
2,403	55,698	193,542	46,260	21,539	85,667	427,782
1,783	48,141	144,053	27,132	22,665	37,871	303,337
809	54,204	191,992	28,407	13,094	76,627	381,929
.....	192,076	278,723	165,107	.....	228,239	875,083
.....	169,361	857,366	201,064	.....	93,596	1,321,409
106	131,452	511,448	41,860	13,834	91,478	792,886
364	204,032	635,920	12,968	12,659	33,531	918,584
121	32,366	1,396,181	78,691	16,883	37,120	1,579,385
37	2,542	32,026	3,075	1,622	21,142	64,178
2,566	68,835	178,012	27,396	32,188	79,549	421,090
3,455	1,038,120	1,533,023	388,684	118,639	676,181	3,956,439
17,148	1,828,527	4,674,959	285,931	289,158	2,637,930	10,714,600
4,825	1,028,401	4,200,252	791,702	135,789	2,121,019	8,518,035
44,497	234,481	960,223	564,775	216,626	1,594,498	3,719,275
192	14,997	18,441	2,626	6,393	9,465	86,755
65	17,013	79,985	387	364	34,847	132,752
3,305	201,670	327,880	71,835	769,929	117,979	1,542,831
86	6,494	109,232	392	15,888	863	132,955
380	35,036	141,521	3,305	23,276	81,905	288,120
35,593	346,205	1,316,936	180,387	289,624	301,204	2,834,429
.....	3,576	40,601	903	.....	8,088	53,392
215	76,954	46,474	3,434	84,268	17,658	247,153
.....	.....	.....	82	10,811	.....	349,924
2,566	.....	.....	3,552	149,605	.....	372,203
5,178	.....	.....	1,341	174,450	.....	365,343
.....	.....	.....	6,094	134,844	10,495	264,394
.....	.....	.....	.....	1,952	1,703	54,361
280,033	13,100,843	40,974,115	6,359,251	4,107,189	14,464,781	84,813,603
239,997	9,713,823	35,072,148	4,842,640	3,195,534	17,530,593	76,082,765

Table 34.—Total Expenditures† by the Canadian Gold Mining Industry, 1934 and 1935

Province	1934	1935
	\$	\$
Nova Scotia.....*	167,152	158,618
Quebec.....	2,268,140	4,390,424
Ontario.....	16,355,851	18,594,916
Manitoba and Saskatchewan.....	1,556,341	1,989,051
British Columbia and Yukon.....	3,646,389	3,574,174
Canada.....	23,993,873	28,707,183

†Comprising items listed in table 33.

Table 35.—Total Expenditures† in Specified Canadian Industries, 1934 and 1935

Industry	1934	1935
	\$	\$
Copper-Gold-Silver mining and smelting.....	9,777,335	9,161,727
Nickel-Copper mining, smelting and refining.....	16,170,299	18,135,440
Silver-Lead-Zinc mining and smelting.....	10,424,827	9,160,667
Silver-Cobalt mining and smelting.....	594,337	717,973
Coal mining and natural gas and oil wells.....	9,626,960	10,965,363
Asbestos mining.....	2,024,264	2,068,488
Clay Products.....	(a)	887,407
Cement.....	(a)	2,656,532
Clay products, Cement, Stone and Lime.....	(a)	5,044,129
Feldspar, Gypsum and other non-metallics.....	(a)	846,932

(a) Information not available.

† Comprising items listed in table 33.

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production and Prices.

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is named “The Auriferous Quartz Mining Industry” and in which industry the gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian gold mining industry.

General Review

The total production of new or primary gold in Canada during the calendar year 1935 totalled 3,284,890 fine ounces valued in Canadian funds, at \$115,595,279 as compared with an output of 2,972,074 fine ounces at \$102,536,553 in 1934. Canadian gold production during 1935 established an all-time high record for both quantity and value. Increases in output over 1934 were recorded for Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. Ontario, Quebec and British Columbia were the principal gold producers accounting, respectively, for 67.5 per cent, 14.3 per cent, and 11.9 per cent of the total Dominion production. It is interesting to note that 1935 witnessed the first officially recorded contribution of lode gold from the Northwest Territories; this represented gold contained in ores shipped from the Great Slave Lake district.

Practically all of Canada’s gold bullion is shipped by the mines to the Royal Canadian Mint at Ottawa. Up until April 19th, 1933, Canada shipped refined gold to New York accepting payment in United States funds at the coinage value, later, after April 19, on which date the United States went off the gold standard, this gold was consigned to London. The present practice, as that prevailing throughout 1934, is to ship gold to the most advantageous market, either London or New York. During the earlier movements of gold to New York the mining companies were paid a premium on the net value of their gold at a rate equivalent to the exchange premium in United States funds on the date of deposit of the gold at the Mint. After April 19, 1933, the Mint paid the producer the standard rate per fine ounce, less charges for melting, assaying and refining, and when the gold was sold in a foreign market the difference between the standard rate and the net amount realized, was returned to the producer or shipper. The average price of gold in Canadian funds in 1935, based on the average price paid by New York or London, was \$35.19 as against \$34.50 in 1934, or, in other words, the value of the 1935 Canadian gold production amounted, in Canadian funds, to \$115,595,279 as against \$102,536,553 in 1934.

The more outstanding events associated with the recent rise in price of gold include the suspension of specie payments by Great Britain on September 21, 1931; the direct control and licensing of Canadian gold exports by the Canadian Government; the purchase by the Canadian Government of all new gold bullion produced in the Dominion with the payment to the miner of equalization exchange; the departure of the United States from the gold standard on April 19, 1933, and the announcement of January 31, 1934, by President Roosevelt, that thereafter the United States Treasury would purchase gold from any quarter at not less than \$35.00 per fine ounce and would be empowered by United States Congress to offer, if necessary, up to \$41.34 an ounce. The weight of the new United States gold dollar is 15 5/21 grains, nine-tenths fine, as compared with the former gold dollar of 25.8 grains, nine-tenths fine. The new dollar contains 1/35 of an ounce of gold and an ounce of fine gold is equivalent to \$35.00.

The year under review was characterized by an almost general increase in exploration throughout Canadian areas considered favourable for gold deposition, and it is expected that several new and promising districts will be investigated in 1936. In addition to the search for new auriferous

deposits, the year witnessed the bringing into production of several new gold mines and the intensive exploration and development of ore bodies recognized as of potential economic importance.

In 1934, the last year for which complete Canadian production data are available, the net value of production by the auriferous quartz mines only comprised 3.52 per cent of the combined net value of production by agriculture, forestry, fisheries, trapping, mining (all branches), electric power, construction, custom and repair and manufactures; it was greater than either fisheries, trapping or custom and repair and it was but 1.33 per cent less than that for construction.

Salaries and wages paid in 1935 by the lode gold mines totalled \$31,523,907 as compared with \$27,156,887 in 1934, and the 1935 salaries and wages, as stated above, were \$12,726,308 in excess of those paid for the same period in the entire Canadian automobile industry and were exceeded in the pulp and paper industry by only \$4,121,341. It is also interesting to note that the value of Canadian gold production per capita totalled \$10.55 in 1935 as compared with \$9.48 in 1934 and \$3.86 in 1925.

The number of employees in the auriferous quartz mining industry in 1935 totalled 19,834 or an increase of 11.7 per cent over the preceding year.

A study of revaluation on the Gold Mining Industry, by John J. Croston, A.I.M.E., and appearing in "The Mining Journal", London, contains the following comment: "... the world's mines have substantially increased their reported ore reserves and total metallic content, but the grade has dropped. This is merely the outward expression of the effect of revaluing the price of gold ... While the two periods cannot be strictly compared, a rough quantitative estimate from the data available shows that revaluation has increased the tonnage of reserves by more than 75 per cent and the total gold content by about 60 per cent. Present metal reserves amount to about three years of world production or about four years of production if the output of the U.S.S.R. is not included".

In a study of prices (1934) Layton and Crowther (England) comment as follows: "Most of the world's currencies have depreciated since 1931 (including those of all the important gold producers) with a consequent rise in the price of gold and in profits of gold mining. This has not only stimulated the production of gold from lower grade ores but has also set a higher monetary value upon existing stocks of gold. It would be rash as yet to prophesy that these changes have converted a potential shortage of gold into an excess, as much will depend upon the extent to which the nations of the world continue to demand gold for monetary uses with the unanimity that they have shown since the war, as well as upon the gold values of the currencies now fluctuating are eventually stabilised, if indeed they are to be stabilised".

Sharps and Wilkins, London, in a review of gold in 1935 state the outstanding features during the year were: (1) The situation caused by the possibility of the Supreme Court of the United States of America declaring the abrogation of the Gold Clause unconstitutional; (2) The devaluation of the Belga which was preceded by a sweeping flight of capital from Belgium; (3) The repeated "bear" attacks on certain gold currencies.

There was a fairly active business in Great Britain in sovereigns, gold dollars and other gold coin. Very large premiums over their gold value were paid from time to time and the demand came simultaneously with the various financial upheavals which have arisen on the Continent during the year.

With a view to stimulating further exploration and development of mineral resources in Canada, the Minister of Finance announced in his Budget Speech on May 1, 1936, that certain exemptions from income tax would be granted to mines subsequently coming into production. Accordingly, an amendment to the Income Tax Act was made providing that any metalliferous mine coming into production between May 1, 1936, and January 1, 1940, shall be exempt from income tax for its first three fiscal periods following the commencement of production. The Minister of National Revenue, having regard to the production of ore in reasonable commercial quantities, shall determine which mines, whether new or old, qualify for this exemption, and a certificate will be issued accordingly. General regulations covering depletion allowance to precious metal mines are unchanged from the previous year and remain on the basis of 33 1/3 per cent for mining companies, with the allowance in the case of dividends received by shareholders standing at 20 per cent.

Royal Canadian Mint.—The Ottawa Mint, established as a branch of the Royal Mint under the (Imperial) Coinage Act, 1870, and opened up on January 2, 1908, was by 21-22 Geo. V, C. 48, constituted a branch of the Department of Finance and since December 1, 1931, has

operated as the Royal Canadian Mint. The great development of the gold mining industry in Canada has resulted in gold refining becoming one of the principal activities of the Mint. Gold coins have never been a popular medium of exchange in Canada and have not been struck since 1919, most of the fine gold produced from the rough shipments from the mines being delivered to the Department of Finance in the form of bars, the rest being sold in convenient form to manufacturers.

The domestic gold currency of Canada, as at present authorized by the Currency Act, consists of \$20, \$10, \$5 and \$2½ gold pieces, 900 millesimal fineness (only \$10 and \$5 pieces have been issued). Gold was used only to an insignificant extent as a circulating medium in Canada, its monetary use being practically confined to reserves; \$5 and \$10 gold pieces weighing respectively 129 and 258 grains, 9/10ths pure gold by weight, have been coined, the Canadian gold dollar thus containing 23·22 grains of pure gold. The \$5, \$10 and \$20 gold coins of the United States, which contain exactly the same weight of gold as Canadian gold coins of these denominations, are legal tender for their face value only, as are the British sovereigns, which are legal tender for \$4·86½, their equivalent in Canadian gold dollars.

The regulations in part for the receipt of gold bullion at the Royal Canadian Mint, Ottawa, are as follows: Each parcel of bullion for which a separate assay is required, shall be regarded as a separate deposit, and no ingot exceeding 1,500 ounces troy, gross weight, will be accepted. All deposits shall be dealt with in the order in which they are received. Deposits containing, by assay, less than 200 parts of gold in 1,000, or appearing, either before or after melting and assaying, to be unsuitable for treatment by the refining process in use, may be rejected. A deposit so rejected shall be returned to the depositor on payment by him of any costs incurred for melting and assaying.

The Mint charges, to be calculated on the gross weight of the deposit after melting, shall be as follows:—

(a) For melting and assaying—one dollar for the first four hundred ounces or part thereof and twenty-five cents for each additional one hundred ounces or part thereof.

(b) For refining—when the deposit contains not more than 5 per cent base metal, 3 cents the ounce.

Over 5 per cent but not over 10 per cent base metal, 3½ cents the ounce.

Over 10 per cent but not over 15 per cent base metal, 4½ cents the ounce.

Over 15 per cent but not over 20 per cent base metal, 5 cents the ounce.

On deposits which contain over 20 per cent base metal, or which require other treatment a charge not exceeding 10 cents the ounce, to be determined by the cost of treatment.

The minimum charge for refining shall be two dollars for each deposit and the charge for refining shall apply to all deposits containing, by assay, less than 995 parts fine gold in 1,000.

An additional handling charge at the rate of 35 cents the ounce fine, to cover costs of realization in a market outside Canada, shall be made on all newly mined Canadian gold deposited with the Mint and this charge shall be increased to \$1.00 the ounce fine on all other gold accepted as a deposit.

The gross value of gold deposited for sale with the Royal Canadian Mint or the Dominion of Canada Assay Office, Vancouver, shall be the market price of gold in the country to which the Government is at the time of the receipt of the deposit exporting gold, converted into Canadian funds at the average of the buying rates of exchange of that country reported to the Department of Finance by the Bank of Canada at 11 a.m. daily during the week in which the gold is deposited with the Mint or Assay office.

In addition to newly-mined Canadian gold there may be accepted at the Mint gold (over 1 ounce troy—fine) in the following forms:—old jewellery and dental scrap, provided it has not been melted or otherwise treated in any way to prevent its origin being readily recognized; scrap from manufacturers and refiners the result of processes carried out by them in the ordinary course of their business; gold coin which when of full weight and fineness, is not legal tender in Canada. Satisfactory evidence as to the origin of the gold shall be furnished by the depositor if required.

Delivery of deposits shall be accepted at the Mint counter only, free of all charges, and when bullion is forwarded by mail or express the original packages will not ordinarily be opened until an invoice of the description and weight of their several contents has been received. When there is a serious discrepancy between the actual and invoice weights of any deposit, further action in regard to it will be deferred pending communication with depositor.

The gross value of a deposit shall be calculated at a rate of one dollar for each 23.22 grains fine gold contained therein (equivalent to \$20.6718 the ounce fine) and at a rate for all silver in excess of one per centum of the weight of the deposit after melting to be determined by the Minister of Finance—the rate to be paid for silver in any week shall be one cent below the average for that week of the daily London quotation for standard silver from Monday to Friday, inclusive, converted into the equivalent for fine silver in Canadian funds at the average of the daily rate of exchange between Montreal and London, calculated to the nearest one-eighth of a cent.

With the opening of the Bank of Canada on March 11, 1935, important changes took place in connection with the monetary gold reserves of the Dominion. The Dominion transferred the gold held against Dominion Notes to the Bank of Canada to an amount of \$69,455,439.44. The Dominion's liability for Dominion Notes outstanding was assumed by the Bank of Canada.

Under section 28 of the Bank of Canada Act the chartered banks were required to transfer to the Bank of Canada all gold coin or bullion owned and held in Canada. The amount transferred to the Bank of Canada was \$37,480,404.46. The gold so transferred was valued at the standard price of \$20.67 per ounce.

Table 36.—Production of New Gold in Canada, by Provinces and Sources, 1934 and 1935
(Gold at \$20.671834 per fine ounce)

	1934		1935	
	Fine ounces	Value	Fine ounces	Value
NOVA SCOTIA—		\$		\$
In gold bullion and in ores exported.....	3,525	72,868	9,376	193,819
Exchange equalization.....		48,745		136,123
QUEBEC—				
In blister copper, in ores shipped and in gold bullion.....	390,097	8,064,020	470,552	9,727,173
Exchange equalization.....		5,394,327		6,831,552
ONTARIO—				
*Porcupine area—In gold bullion.....	949,799	19,634,087	968,546	20,021,622
*Kirkland Lake—In gold bullion.....	988,046	20,424,723	948,044	19,597,808
*Other gold mines—In gold bullion.....	107,120	2,214,367	234,545	4,843,475
Copper-nickel and other ores.....	60,374	1,248,041	69,201	1,430,512
Total.....	2,105,339	43,521,218	2,220,336	45,898,417
Exchange equalization.....		29,112,977		32,235,207
MANITOBA—				
In gold bullion, ores shipped and in blister copper.....	132,321	2,735,318	142,613	2,948,072
Exchange equalization.....		1,829,757		2,070,479
SASKATCHEWAN—				
In ores shipped to Canadian smelters and crude gold to Royal Canadian Mint.....	5,405	111,731	14,323	296,083
Exchange equalization.....		74,741		207,943
ALBERTA—				
In alluvial gold.....	393	8,124	150	3,101
Exchange equalization.....		5,434		2,178
BRITISH COLUMBIA				
In alluvial gold.....	20,145	416,434	24,744	511,504
In gold bullion.....	153,173	3,166,367	191,138	3,951,173
In blister copper.....	6,063	125,333	5,170	106,873
In base bullion and in matte and ores exported.....	116,815	2,414,781	170,561	3,526,222
Total.....	296,196	6,122,915	391,633	8,095,772
Exchange equalization.....		4,095,847		5,685,793
YUKON—				
In alluvial gold.....	38,703	800,062	35,705	738,088
In ores exported.....	95	1,964	202	4,175
Total.....	38,798	802,026	35,907	742,263
Exchange equalization.....		536,505		521,304
Total for Canada.....	2,972,074	61,438,229	3,284,890	67,904,700
Estimated exchange equalization on gold produced.....		41,098,333		47,690,579
Grand Total Value, including exchange equalization.....		102,536,553		115,595,279

* Includes small amounts of gold contained in slags, etc.

In 1934 the estimated average price of a troy ounce of fine gold in Canadian funds was \$34.50; in 1935 the corresponding price was \$35.19.

Table 37.—Production of Gold in Canada by Principal Mines, 1935

Property and Province	Ore raised	Ore treated	Gold shipped	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
NOVA SCOTIA—					
Caribou Gold Mines (Consolidated Mining & Smelting Co.)	868	868	136	24	(a)
Corwin Gold Mines Ltd.	10			24	(a)
Centre Rawdon (A. Deal)	14	5		4	(a)
Douglas, L. H. (Whiteburne)	(b)	131	16	12	(a)
Eureka Mines Ltd.	77	77	67	6	(a)
Foot, C. (Lake Catcha)		5		6	(a)
Giffin Gold Mines Ltd.	15	(b)		19	(b)
Gold River Mining Syndicate Ltd.	142	43	5	24	(a)
Guysborough Mines Ltd.	16,670	13,524	2,508	50	(a)
Higgins and Lawlor	1,847	1,847	1,550	15	(a)
Lake Thomas Syndicate Ltd.	3,043	1,649	573	22	(a)
Montague Gold Mines Ltd.	28,355	14,172	3,561	50	(a) (e)
Seal Harbour Gold Mines Ltd.	3,828	3,828	606	24	(a)
United Goldfields of N.S. Ltd.	481	481	60	12	(a) (e)
Other gold producers	(b)	(b)	294	(b)	
Total—Nova Scotia			9,376		
QUEBEC—					
Arntfield Gold Mines Ltd.	21,000	25,574	5,037	125	(c)
Beattie Gold Mines Ltd.	435,110	435,760	52,549	1,400	(c) (e)
Bussieres Mining Co. Ltd.	17,983	15,388	2,786	190	(a) (e)
Canadian Malartic Gold Mines Ltd.	39,221	39,221	7,951	150	(c)
Granada Gold Mines Ltd.	40,000	38,240	5,083	200	(a)
Green Stabell Mines Ltd.	28,728	25,465	6,854	80	(a) (e)
Lamaque Gold Mines Ltd.	83,847	83,847	26,713	450	(c)
McWatters Gold Mines Ltd.	24,444	24,441	17,079	150	(a) (c) (e)
O'Brien Gold Mines Ltd.	30,041	27,151	4,076	80	(a) (c)
Perron Gold Mines Ltd.	7,648	7,529	2,057	25	(a)
Siscoe Gold Mines Ltd.	149,485	149,070	64,560	408	(a) (e)
Sullivan Consolidated Mines Ltd.	41,387	31,196	13,301	110	(a) (c)
Other properties, including copper-gold-silver and silver-lead-zinc mines			262,506		
Total—Quebec			470,552		
ONTARIO—					
Algoma Summit Gold Mines Ltd.		205	86	18	(a)
Anglo-Huronian Ltd. (Vipond)	106,526	106,393	11,864	300	(c)
Ardeen Gold Mines Ltd.	(b)	5,884	849	200	(c)
Ashley Gold Mining Corp. Ltd.	47,366	47,366	12,486	150	(c)
Barry-Hollinger Mines Ltd.	35,172	35,172	4,083	100	(c)
Biggood Kirkland Gold Mines Ltd.	11,148	11,148	1,233	50	(c)
Buffalo Ankerite Gold Mines Ltd.	159,383	159,383	29,042	500	(c)
Central Patricia Gold Mines Ltd.	(b)	35,192	22,061	100	(c)
Clark Gold Mines Ltd.	77	77			(f)
Concordia Gold Mining Co., Ltd.	230	230	36	5-9	(a)
Coniarum Mines Ltd.	151,055	151,055	32,152	500	(c)
Darwin Gold Mines Ltd.	1,951	2,103	504	50	(a) (c)
Dome Mines Ltd.	549,100	549,100	206,795	1,500	(a) (c)
Duport Mining Co. Ltd.	(b)	475	2,098		(f)
Gillies Lake -Porcupine Gold Mines Ltd.	5,100	5,122	1,612	25	(a)
Hollinger Consolidated Gold Mines Ltd.	1,837,150	1,837,153	416,050	6,000	(c)
Howey Gold Mines Ltd.	484,966	484,966	37,674	1,100	(c)
J. M. Consolidated Gold Mines Ltd.	(b)	1,381	361	25	(a) (c)
Kenora Prospectors & Miners Ltd.	2,685	3,095	657	50	(a) (e)
Kirkland Lake Gold Mining Co. Ltd.	(b)	71,920	22,051	225	(c)
Lake Shore Mines Ltd.	836,322	836,322	461,019	2,300	(c)
Little Long Lac Gold Mines Ltd.	62,073	62,073	31,454	200	(a) (c)
Macassa Mines Ltd.	68,820	68,627	30,272	200	(c)
Mac-Auer Gold Mines Ltd.	20	45	8	4	(a)
Marbuan Gold Mines Ltd.	59,380	59,380	8,145	160	(c)
Matachewan Consolidated Mines Ltd.	49,847	48,362	10,114	100	(c)
McIntyre Porcupine Mines Ltd.	869,100	869,100	245,206	2,000	(c)
McKenzie Red Lake Gold Mines Ltd.	42,113	36,117	15,113	125	(c)
McLaren-Porcupine Gold Mines Ltd.	4,000	600	109	10-15	(a)
McMartin, J. Bruce	(b)	3,295	1,378	20	(c)
McMillan Gold Mines Ltd.	34,447	40,215	7,777	140	(a) (c)
Minto Gold Mines Ltd.	34,890	34,890	5,571	100	(c)
Moffat-Hall Mines Ltd.	7,912	7,912	2,243		(c)
Naybob Gold Mines Ltd.	12,522	10,681	671	100	(c)
Northern Empire Mines Co., Ltd.	45,673	45,736	18,278	175	(c)
North Shore Gold Mines Ltd.	1,404	1,404	834	25	(b)
Parkhill Gold Mines Ltd.	20,871	20,871	9,619	75	(c)
Paymaster Consolidated Mines Ltd.	80,780	79,845	16,028	500	(c)
Pickle Crow Gold Mines Ltd.	31,533	37,277	24,925	150	(a) (c)
St. Anthony Gold Mines Ltd.	(b)	34,538	8,584	125	(c) (i)
S.B. Smith Mine	7,946	7,946	1,392	50	(a)

Table 37.—Production of Gold in Canada by Principal Mines, 1935—Continued

Property and Province	Ore raised	Ore treated	Gold shipped	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
ONTARIO—Continued—					
Sol d'Or Gold Mines Ltd.....	(b)	119	41	5	(a)
Sylvanite Gold Mines Ltd.....	151,440	152,281	54,356	400	(c)
Tashota Goldfields Ltd.....	14,136	12,827	2,158	50	(a) (e)
Teck-Hughes Gold Mines Ltd.....	376,588	376,588	138,987	1,300	(c) (k)
Toburn Gold Mines Ltd.....	(b)	35,360	20,200	100	(c)
Wright-Hargreaves Mines Ltd.....	361,149	361,149	213,471	1,000	(c)
Young-Davidson Mines Ltd.....	229,251	229,793	20,150	600	(c)
Other gold mines.....		(b)	1,322		
Nickel-copper mines.....			69,201		
Total—Ontario.....			2,220,336		
MANITOBA—					
Central Manitoba Mines Ltd.....	45,346	41,485	10,997	400	(a) (c)
Diana Gold Mines Ltd.....	17,825	13,114	3,657	200	(a)
Forty Four Mines Ltd.....	1,068	1,068	241		(1)
God's Lake Gold Mines Ltd.....	(b)	14,423	3,779	450	(a) (c)
Island Lake Mines Ltd.....	2,349	1,635	3,159	50	(a) (e)
San Antonio Gold Mines Ltd.....	102,691	102,712	32,009	350	(a) (c)
Vanson Manitoba Gold Mines Ltd.....	(b)	15	5	15	(a)
Copper-gold-silver ores.....			88,766		
Total Manitoba.....			142,613		
SASKATCHEWAN—					
Copper-gold-silver ores.....			14,323		
BRITISH COLUMBIA—					
Abco Mines Ltd.....	160	45	143		(f)
Ashloo Gold Mines Ltd.....	383	8	33		(f)
Bayonne Consolidated Mines Ltd.....	35	35	120		(f)
Bralorne Mines Ltd.....	145,113	145,113	47,023	450	(a) (e)
Cariboo Gold Quartz Mining Co., Ltd.....	43,269	43,417	17,026	150	(c)
Danzig Mines Inc.....	(b)	24	33		(f)
Dentonia Mines Ltd.....	32,447	32,447	12,012	100	(f)
Evening Star Syndicate.....	(b)	624	469		(f)
Franklin River Gold Mines, B.C.....	15	15	12		(f)
Gold Fern Mines Ltd.....	2	2	12		(f)
Granby Point Mine.....	(b)	8,907	705		(f)
Grandoro Mines Ltd.....	7,972	7,972	1,635	40	(a) (c) (e)
Grange Mines Ltd.....	4,402	4,300	664	50	(c) (e)
Island Mountain Mines Co., Ltd.....	30,340	30,340	18,209	100	(c) (e)
I.X.L. Leasors Ltd.....	(b)	165	484		(f)
Kootenay Belle Gold Mines Ltd.....	17,100	14,650	5,845	50	(a) (e)
Kelowna Exploration Co., Ltd.....	55,314	54,032	14,021	200	(a) (e)
Livingstone Mining Co., Inc.....	833	600	233	(b)	(a) (e)
Loughborough Gold Mines Ltd.....	62	62	62		(f)
Mak Sicear Gold Mines Ltd.....	(b)	110	94		(f)
McArthur, W. E. (Skylark).....	230	230	101		(f)
McArthur, W. E. (No. 7).....	2,296	2,296	463		(f)
McCarthy, J. F. (Union Mine).....	8,530	8,530	1,164	200	(f) (g)
Midnight Syndicate.....	95	95	50		(f)
Minto Gold Mines Ltd.....	20,558	20,558	4,225	50	(a) (e)
O.K. Leasing Co.....	55	55	102		(f)
Oialla Gold Mines Ltd.....	50	20	15		(f)
Oscarson Bros. (Arlington).....	364	341	617		(f)
Osoyoos Mines Ltd.....	3,600	3,550	678	25	(f)
Pioneer Gold Mines Ltd.....	135,781	135,647	87,700	300	(c)
Pre Cambrian Gold Mines.....	1,838	1,838	259	30	(f)
Premier Gold Mining Co., Ltd.....	149,672	149,671	32,120	500	(f)
Relief Arlington Mines Ltd.....	16,799	12,998	4,209	70	(c) (e)
Reno Gold Mines Ltd.....	39,917	39,862	21,528	120	(a) (c) (e)
Riegel Mines Ltd.....	908	908	502		(f)
Sheep Creek Gold Mines Ltd.....	28,197	28,197	9,081	150	(c)
Timmins N. A. Corp. (Surf Point).....	12,113	7,075	4,384	20	(f) (h)
Vancouver Island Gold Mines Ltd.....	75	75	100		(f)
Velvet Gold Mining Co.....	3,000	2,850	536	50	(f)
Venus-Juno (Gormley, G. F.).....	93	93	205		(f)
Vidette Gold Mines Ltd.....	7,330	7,052	4,278	35	(f)
Wayside Consolidated Gold Mines Ltd.....		2,693	826	20	(a)
Wilcox Mining Syndicate.....	1,595	(b)	628	20	(a) (e)
Windpass Gold Mining Co., Ltd.....	14,535	15,732	6,347	60	(f)
Ymir Consolidated Gold Mines Ltd.....		11,450	2,175	100	(a) (e)
Ymir Yankee Girl Gold Mines Ltd.....	(b)	31,480	8,075	100	(c) (e)
Placer gold.....			24,744		
Copper-gold-silver-lead- and other mines.....			57,632		
Total—British Columbia.....			391,633		

Table 37.—Production of Gold in Canada by Principal Mines, 1935—Concluded

Property and Province	Ore raised	Ore treated	Gold shipped	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
NORTHWEST TERRITORIES— Burwash Yellowknife Mines Ltd.....	16	16	200	.....	(f)
YUKON TERRITORY— Placers.....			35,707	.....	(i)
ALBERTA— Placers.....			150	.....
Total—Alberta and Territories.....			36,057	.....
Grand Total—Canada.....			3,284,890	.....

(a) Amalgamation.

(b) Information not available.

(c) Cyanidation.

(e) Includes gold in concentrates shipped to smelter

(f) Represents gold in crude ore or concentrates shipped.

(g) In addition, 6,207 tons of tailings were retreated.

(h) 5,038 tons of waste rock hand sorted.

(i) Includes a small quantity of gold contained in silver-lead ores.

(j) In addition, 10,012 tons of tailings were retreated.

(k) In addition, 41,329 tons of tailings were retreated.

(l) Treated at other properties.

NOTE.—In addition to the ounces of gold recorded as being shipped, a relatively few operators reported gold as contained in concentrates of crude bullion held at the mine.

Table 38.—Production of Gold in Canada, 1926-1935

Year	Fine ounces	Value*	Year	Fine ounces	Value*	Value in Canadian funds
		\$			\$	\$
1926.....	1,754,228	36,263,110	1931.....	2,693,892	55,687,688	58,093,396
1927.....	1,852,785	38,300,464	1932.....	3,044,387	62,933,063	71,479,373
1928.....	1,890,592	39,082,005	1933.....	2,949,309	60,967,626	84,350,237
1929.....	1,928,308	39,861,663	1934.....	2,972,074	61,438,220	102,536,553
1930.....	2,102,068	43,453,601	1935.....	3,284,890	67,904,700	115,595,279

NOTE.—For years 1858 to 1925, see previous reports.

*Calculated from the value \$1=0.048375 ounces.

Table 39.—Quantity and Value of Gold Produced in Canada, by Provinces, 1926-1935

(For the years 1862 to 1925, see Mineral Production of Canada, 1928)

Year	Nova Scotia			Quebec		
	Fine oz.	Valued at \$20-671834 per fine oz. \$	Value in Canadian dollars \$	Fine oz.	Valued at \$20-671834 per fine oz. \$	Value in Canadian dollars \$
1926	1,678	34,687	.....	3,680	76,072	.....
1927	3,151	65,137	.....	8,331	172,217	.....
1928	1,290	26,667	.....	60,006	1,240,434	.....
1929	2,687	55,545	.....	90,798	1,876,961	.....
1930	1,272	26,295	.....	141,747	2,930,170	.....
1931	460	9,509	9,920	300,075	6,203,101	6,471,075
1932	964	19,928	22,634	401,105	8,291,576	9,417,572
1933	1,382	28,568	39,525	382,886	7,914,956	10,950,539
1934	3,525	72,868	121,613	390,097	8,064,020	13,458,347
1935	9,376	193,819	329,942	470,552	9,727,173	16,558,725

Year	Ontario			Manitoba		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1926	1,497,215	30,950,180	.....	188	3,886	.....
1927	1,627,050	33,634,108	.....	182	3,762	.....
1928	1,578,434	32,629,126	.....	19,813	409,571	.....
1929	1,622,267	33,535,234	.....	22,455	464,186	.....
1930	1,736,012	35,886,552	.....	23,189	479,359	.....
1931	2,085,814	43,117,600	44,980,280	102,969	2,128,558	2,220,512
1932	2,280,105	47,133,952	53,534,743	122,507	2,532,444	2,876,350
1933	2,155,519	44,558,351	61,647,843	125,310	2,590,388	3,583,866
1934	2,105,339	43,521,218	72,634,195	132,321	2,735,318	4,555,075
1935	2,220,336	45,898,417	78,133,624	142,613	2,948,072	5,018,551

Year	Saskatchewan			Alberta		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1926	.....	.....	.....	.....	.....	.....
1927	.....	.....	.....	42	868	.....
1928	.....	.....	.....	68	1,406	.....
1929	.....	.....	.....	5	103	.....
1930	.....	.....	.....	.....	.....	.....
1931	.....	.....	.....	195	4,031	4,205
1932	11	227	258	83	1,716	1,949
1933	5,400	111,628	154,440	324	6,698	9,267
1934	5,405	111,731	186,472	393	8,124	13,558
1935	14,323	296,083	504,026	150	3,101	5,279

Year	British Columbia			Yukon		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1926	225,866	4,669,055	.....	25,601	529,220	.....
1927	183,094	3,784,889	.....	30,935	639,483	.....
1928	196,617	4,064,434	.....	34,364	710,367	.....
1929	154,204	3,187,680	.....	35,892	741,954	.....
1930	164,331	3,397,023	.....	35,517	734,202	.....
1931	160,069	3,308,920	3,451,865	44,310	915,969	955,539
1932	199,004	4,113,778	4,672,429	40,608	839,442	953,438
1933	238,995	4,940,465	6,835,257	39,493	816,392	1,129,500
1934	296,196	6,122,915	10,218,762	38,798	802,026	1,338,531
1935	391,633	8,095,772	13,781,565	*35,907	742,263	1,263,567

*Includes 200 fine oz. contained in ore shipped from the Northwest Territories

Table 40.—Total Gold Production in Ontario*

Year	Total production	Porcupine belt		Kirkland Lake belt		N.W. Ontario (c)	
	\$	\$	per cent	\$	per cent	\$	per cent
1866-1891.....	\$190,258						
1892-1909.....	\$2,509,492						
1910.....	68,498	35,539	51.8				
1911.....	42,637	15,437	36.2				
1912.....	2,114,086	1,730,628	81.8				
1913.....	4,558,518	4,294,113	94.1	86,316	1.9		
1914.....	5,544,979	5,206,006	93.8	114,154	2.0		
1915.....	8,501,391	7,462,111	88.6	551,069	6.5		
1916.....	10,339,259	9,391,408	90.8	702,761	6.8		
1917.....	8,698,735	8,229,744	94.5	404,346	4.6		
1918.....	8,502,480	7,767,907	91.4	632,007	7.4		
1919.....	10,451,709	9,941,803	95.1	486,809	4.7		
1920.....	11,686,043	10,597,572	90.7	1,033,478	8.8		
1921.....	14,692,357	13,103,526	89.5	1,524,851	10.4		
1922.....	20,579,569	18,374,658	89.3	2,159,581	10.5		
1923.....	20,136,287	17,313,115	85.9	2,719,939	13.5		
1924.....	25,669,303	22,135,534	86.2	3,446,632	13.4		
1925.....	30,206,432	24,733,120	81.8	5,385,256	17.8		
1926.....	30,950,753	23,680,670	76.5	7,174,083	23.2		
1927.....	33,627,040	23,851,857	70.9	9,674,114	28.7		
1928.....	32,629,111	20,246,319	62.0	12,233,524	37.5		
1929.....	33,535,226	19,281,286	57.6	14,046,596	41.8	22,988	0.07
1930.....	35,886,558	17,758,842	49.6	17,172,770	47.9	461,730	1.3
1931.....	43,117,615	19,891,521	46.2	21,734,729	50.4	1,007,756	2.3
1932.....	47,284,621	21,422,117	45.2	23,782,313	50.3	1,607,831	3.4
1933.....	44,558,514	21,624,617	48.5	20,817,277	46.7	1,352,017	3.0
1934.....	43,521,249	19,634,097	45.0	20,424,716	46.9	2,214,385	5.0
1935 (a).....	45,898,417	20,021,622	43.6	19,597,808	42.7	4,848,475	10.6
Total to end of 1935.....	575,501,137	367,745,169	63.9	155,905,129	32.3		

*Supplied by Ontario Department of Mines. All values given are standard.

†Estimated.

‡Maximum yearly output was \$424,568 in 1899.

(a) Subject to revision.

(c) Recent production only.

Table 41.—World Production of Gold Ore, 1933-1935

(In terms of metal) (Supplied by Imperial Institute)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
	Fine ounces	Fine ounces	Fine ounces		Fine ounces	Fine ounces	Fine ounces
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
United Kingdom.....	57	51	148	U.S.S.R. (Russia) (d).....	2,500,000	3,700,000	4,500,000
Anglo-Egyptian Sudan.....	4,400	5,398	8,551	Yugoslavia (estimated)....	28,000	36,000	43,000
Bechuanaland Protectorate.....	5,332	9,485	5,911	Belgian Congo.....	279,801	329,441	390,000
Gold Coast.....	305,908	326,040	358,835	Cameroon (French).....		450	2,829
Kenya.....	10,531	12,110	23,009	Egypt.....		201	58
Nigeria.....	17,718	37,023	38,962	Eritrea.....	3,569	8,000	(a)
Northern Rhodesia.....	2,588	2,113	1,647	French Equatorial Africa.....	26,556	29,160	29,657
Southern Rhodesia.....	642,499	691,152	726,281	French West Africa (ex-ports).....	68,608	98,957	125,385
Sierra Leone.....	14,484	21,205	30,753	Madagascar.....	14,468	15,979	15,464
South West Africa.....	956	908	3,206	Morocco (French zone).....			7,780
Swaziland.....	630	379	314	Mozambique.....	1,705	10,196	7,579
Tanganyika Territory.....	32,516	42,606	52,182	Costa Rica (c).....	2,969	13,660	(a)
Uganda.....	1,200	5,842	5,651	Dominican Republic.....		5,312	(a)
Union of South Africa.....	11,013,712	10,479,857	10,773,991	Guatemala.....	7,419	7,500	4,214
Canada.....	2,949,309	2,972,074	3,284,890	Honduras.....	17,211	12,996	12,274
Newfoundland.....	15,689	11,219	12,728	Nicaragua.....	(c) 6,681	(c) 18,362	24,789
British Guiana.....	23,352	25,420	30,488	Panama.....	646	15,053	5,198
Cyprus.....		13,092	(f) 6,872	Porto Rico.....	27	57	64
Federated Malay States.....	29,036	30,221	29,771	Salvador.....	(c) 2,691	6,824	8,129
Unfederated Malay States.....	2,131	1,197	276	Mexico (b).....	637,727	661,390	682,319
India.....	336,100	322,100	327,600	United States (b).....	2,291,724	2,778,789	3,231,608
Sarawak.....	18,712	28,842	28,549	Argentina (estimated)....	1,000	1,000	1,000
Australia.....	830,267	886,609	917,262	Brazil.....	117,804	110,900	119,084
Fiji.....	1,844	931	6,727	Chile.....	147,392	237,656	274,247
New Guinea.....	(e) 121,913	190,000	280,564	Colombia.....	298,243	344,310	328,991
New Zealand.....	161,755	160,248	165,277	Dutch Guiana (crude).....	12,391	11,887	11,340
Papua.....	9,850	12,591	20,000	Ecuador.....	58,865	61,538	61,818
Total.....	16,550,000	16,290,000	17,140,000	French Guiana (exports).....	48,000	45,524	47,421
FOREIGN COUNTRIES—				Peru.....	96,775	98,850	110,959
Bulgaria.....		14	17	Venezuela.....	95,720	109,055	(a)
Czechoslovakia.....	9,836	11,990	14,334	China.....	114,922	105,591	(a)
France.....	94,500	101,498	91,598	Formosa.....	61,500	(a)	(a)
Germany.....	5,494	5,769	5,957	French Indo-China.....	145	7,105	8,552
Hungary.....	3,099	2,167	2,070	Japan.....	441,374	486,963	589,030
Italy.....	2,725	3,700	4,000	Korea.....	390,000	420,000	540,000
Norway.....		129	231	"Manchoukuo".....	21,635	46,767	(a)
Roumania.....	142,585	111,496	112,840	Netherlands East Indies.....	78,896	71,865	68,249
Spain.....	7,716	7,596	(a) 554	Philippine Islands.....	296,258	340,314	444,655
Sweden.....	288,643	246,687	180,554	Total.....	8,700,000	10,800,000	12,300,000
				World's Total.....	25,300,000	27,100,000	29,400,000

(a) Information not available. (b) Amount recovered. (c) Imports into the United States from the country indicated. (d) Approximate figures only. It is not possible to form any reliable estimate from the data given in special publications. (e) Year ended June 30 of the year stated. (f) Exports.

Table 42.—Comparative Figures of Gold Production for the World Since the Discovery of America, Transvaal, United States and Canada

Period	Transvaal since the commencement of Fields (b)	*United States	Canada since the recording of Production in 1853	(a) World since the discovery of America
	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1493-1600.....				24,266,820
1601-1700.....				29,330,445
1701-1800.....				61,088,215
1801-1840.....				20,488,552
1841-1850.....		(c) 1,187,170		17,605,018
1851-1860.....			220,039	64,482,933
1861-1870.....		(d) 58,279,778	1,477,999	61,098,343
1871-1880.....		(e) 15,281,264	904,093	55,670,618
1881-1890.....	1,070,651	15,808,339	584,102	51,280,184
1891-1895.....	6,870,158	9,106,834	291,564	39,412,823
1896-1900.....	12,578,869	15,728,572	3,469,791	62,234,698
1901-1905.....	13,632,908	19,393,722	4,592,261	78,033,650
1906.....	5,792,823		556,415	19,471,080
1907.....	6,450,740		405,517	19,977,260
1908.....	7,056,266	22,993,218	476,112	21,422,244
1909.....	7,295,108		453,865	21,965,111
1910.....	7,527,108		493,707	22,022,180
1911.....	8,249,461	4,687,053	473,159	22,397,136
1912.....	9,107,512	4,520,719	611,885	22,605,068
1913.....	8,798,336	4,299,784	802,973	22,928,579
1914.....	8,394,322	4,572,976	773,178	21,875,618
1915.....	9,093,902	4,887,604	918,056	23,010,348
1916.....	9,296,618	4,479,057	930,492	22,400,370
1917.....	9,018,084	4,051,440	738,831	20,457,475
1918.....	8,418,292	3,320,784	699,681	18,701,294
1919.....	8,331,294	2,918,628	766,764	17,376,201
1920.....	8,158,226	2,476,166	765,007	16,130,273
1921.....	8,128,681	2,422,006	926,329	16,006,695
1922.....	7,009,767	2,363,075	1,263,364	15,576,270
1923.....	9,148,771	2,502,632	1,233,341	17,977,807
1924.....	9,574,918	2,528,900	1,525,382	18,667,063
1925.....	9,597,573	2,411,987	1,735,735	18,734,102
1926.....	9,954,762	2,335,042	1,754,228	19,251,794
1927.....	10,122,459	2,197,125	1,852,785	19,180,231
1928.....	10,354,157	2,233,251	1,890,592	19,399,124
1929.....	10,412,326	2,208,386	1,928,308	19,585,536
1930.....	10,716,349	2,285,603	2,102,068	20,836,318
1931.....	10,877,708	2,395,878	2,693,892	22,329,525
1932.....	11,557,858	2,449,032	3,044,387	24,150,761
1933.....	11,017,495	2,556,246	2,949,309	24,962,408
1934.....	10,479,194	3,091,183	2,972,074	27,930,463
1935.....	10,773,041	3,618,843†	3,284,890	†30,660,357
Total.....	304,865,737	235,592,297	52,562,175	1,192,980,990

*Including Philippine Islands production received in United States.

†Preliminary estimate—American Bureau Metal Statistics.

(a) Supplied by United States Mint.

(b) Supplied by Transvaal Chamber of Mines.

(c) 1792-1847.

(d) 1848-1872.

(e) 1873-1880.

Table 43.—Source of Canadian Fine Gold Production by Percentages, 1932-1935

	1932	1933	1934	1935
	%	%	%	%
In alluvial gold.....	1.8	2.0	2.0	1.84
In crude gold bullion*.....	79.3	79.8	78.68	78.83
In base bullion (from silver-lead ores, etc.).....	1.0	0.7	1.09	2.17
In blister copper.....	15.1	14.2	13.41	13.21
In ores, mattes, slags, etc., exported.....	2.8	3.3	4.82	3.95
	100.00	100.00	100.00	100.00

*Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores to smelters.

Table 44.—Imports into Canada and Exports of Gold, 1934 and 1935

	1934	1935
	\$	\$
IMPORTS—		
Coins and bullion—		
Coins, British, Canadian and foreign gold coins.....	714,496	847,123
Gold bullion in bars, blocks, ingots, drops, sheets or plates, unmanufactured.....	56,343	366,750
Total.....	770,839	1,213,873
Gold, other—		
Bullion or gold fringe.....	8,456	15,771
Manufactures of gold and silver—		
Leaf.....	61,908	62,430
Sweepings.....	140	.....
Manufactures, n.o.p.....	23,860	24,285
Electro-plated ware.....	384,400	439,613
Gold, unmanufactured, for commercial purposes.....	157,691	137,427
Total.....	636,455	679,526
EXPORTS—		
Coin and bullion—		
Gold coin—		
Canadian.....		
Foreign.....	83,480	9,601,367
Gold bullion—		
Canadian, n.o.p.—		
To United Kingdom..... oz.	788,027	96,992
United States..... oz.	26,762,697	3,395,500
Foreign.....	2,256,781	2,649,419
Foreign.....	78,570,316	92,594,734
Total—Canadian coin and bullion..... oz.	3,044,805	2,746,411
Foreign coin and bullion.....	105,333,013	95,990,234
Total coin and fine gold bullion.....	108,377,818	98,736,645
*Gold-bearing quartz, dust, nuggets and crude bullion obtained direct from mining operations....	3,997,992	4,316,421
Jewellers' sweepings (gold, silver and platinum).....	520,067	772,725
Total.....	4,518,059	5,089,146

*Metal content in 1935—125,434 fine ounces of gold.

MONETARY AND NON-MONETARY GOLD IN TRADE STATISTICS

The Bureau of Statistics has experienced considerable difficulty in recent years in connection with the treatment of gold in trade statistics, especially in the case of exports. In former times there was some movement of gold as merchandise; for example, Canada exported gold-bearing quartz, dust, nuggets, and bullion obtained direct from mining operations to the United States for refining purposes. These exports were recorded as merchandise. When the Royal Mint began refining gold in Ottawa, this gold-bearing quartz, dust, nuggets, etc., began to be exported in the form of gold bullion, and to be recorded under the "coin and bullion" section. The question of recording gold in import and export trade came up for discussion at the conference of Commonwealth Statisticians which met in Ottawa in the Fall of 1935, when the following resolution was passed:—

- (a) Imports and exports of gold should be published according to countries, by quantities in fine ounces and values in the currency used in the national statistics.
- (b) Total imports and total exports of gold should be classified into—
 - (i) Gold metal—
 - (a) In bars (in the form accepted in inter-bank transactions);
 - (b) Other unworked gold.
 - (ii) Gold coin.
- (c) As far as practicable, the imports and exports of gold for monetary purposes should be indicated.

The Bureau has since been in conference with the Bank of Canada and the Department of National Revenue, and has developed a policy whereby all gold bullion which goes out of the country as "merchandise" will be entered as such and will be recorded in total commodity exports. This will make a considerable difference in the ordinary trade figures of "favourable" or "unfavourable" trade balances, as the bullion exports have grown to nearly \$100,000,000 a year.

From April 1, 1936, exports of Canadian gold bullion, non-monetary, formerly included under "Coin and Bullion" will be recorded as "Merchandise". This will necessitate a revision of Canada's "Merchandise" and "Coin and Bullion" exports, from about 1920 to date.

Balance of Payments.—The preliminary statement of the estimated balance of international payments for Canada in 1935 shown in the following table presents estimates of Canada's trade in goods, services and gold with other countries. The significance of gold in Canada's international transactions is made apparent from this table. The three most important items producing a credit balance during the year were the commodity trade, the tourist trade and net gold exports. The surplus of credits furnished by these classes of transaction more than offset the large net interest and dividend payments to the British and foreign owners of investments in Canada.

Table 45.—Estimated Balance of International Payments for Canada—Preliminary Statement for 1935

(Internal Trade Branch—Dominion Bureau of Statistics)
PART A.—CURRENT ITEMS OF GOODS, SERVICES AND GOLD
(In millions)

	Exports Visible and Invisible	Imports Visible and Invisible	Net Debit (—) or Credit (+)
1. Commodity trade (adjusted).....	740.0	542.0	+198.0
2. Exports and imports of gold coin and bullion.....	112.4	1.7	+110.7
3. Freight receipts and payments, n.o.p.....	55.0	84.0	— 29.0
4. Tourist expenditures.....	202.3	79.4	+122.9
5. Interest and dividend receipts and payments.....	98.0	317.0	—219.0
6. Immigrant remittances.....	6.0	6.7	— 0.7
7. Government expenditures and receipts.....	5.9	10.0	— 4.1
8. Charitable and missionary contributions.....	2.6	1.5	+ 1.1
9. Insurance transactions (net figure).....	.....	8.0	— 8.0
10. Advertising transactions.....	2.0	1.5	+ 0.5
11. Motion picture earnings.....	.....	2.8	— 2.8
12. Capital of immigrants and emigrants.....	1.8	3.0	— 1.2
13. Earnings of Canadian residents employed in U.S.A. (net figure).....	1.2	.....	+ 1.2
14. Total credits and debits shown above.....	1,227.2	1,057.6	+169.6
15. Difference between credits and debits as above. (This difference is made up of capital movements and errors and omissions)	.....	169.6	.....
	1,227.2	1,227.2	.....

PART B.—CAPITAL ITEMS, 1935
(In millions)

	Cr.	Dr.	
1. Sales and purchases of securities.....	301.8	250.7	+ 51.1
2. Retirements.....	.....	190.0	—190.0
3. New series (including refinancing).....	116.5	.....	+116.5
4. Direct investments (long-term).....	6.0	.....	+ 6.0
5. Balancing item—Net outflow of capital funds.....	16.4	.....	.....
	440.7	440.7	— 16.4

Table 46.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds, 1932-1935

	1932	1933	1934	1935
	\$	\$	\$	\$
January.....	24.24	23.64	33.05	34.95
February.....	23.67	24.74	35.29	35.05
March.....	23.11	24.78	35.08	35.40
April.....	22.98	25.33	34.93	35.18
May.....	23.38	27.75	34.94	34.95
June.....	23.83	28.24	34.73	35.05
July.....	23.73	30.58	34.59	35.08
August.....	23.61	30.09	34.19	35.09
September.....	22.88	31.79	34.18	35.28
October.....	22.65	31.48	34.27	35.49
November.....	23.73	32.68	34.16	35.37
December.....	23.85	32.14	34.57	35.33
Yearly average.....	23.48	28.60	34.50	35.19

The Canadian cost of living index number continued to move gradually upward during 1935, advancing irregularly from 78·9 in December, 1934, to 80·8 in December, 1935. When it is recalled that the extreme low point of the recent decline was 76·6 for June of 1933, the moderate proportions of subsequent increases may be better appreciated. The rise in living costs in the past three years relative to improvement in primary product prices has been smaller than in many other countries.

Table 47.—Gold Held by the Canadian Minister of Finance, Calendar Years 1920-1935†

Calendar Year	Gold Reserve Held on Postal Savings Bank Deposits (a)	Gold Held for Redemption of Dominion Notes	Total Gold Held by Minister of Finance
	\$	\$	\$
1920.....	4,067,897	98,751,773	102,819,670
1921.....	3,666,009	84,568,064	88,234,073
1922.....	3,293,287	89,939,108	93,232,395
1923.....	3,154,358	120,651,627	123,805,985
1924.....	3,308,575	107,257,428	110,566,003
1925.....	3,241,490	119,744,819	122,986,309
1926.....	3,162,930	109,369,550	112,532,480
1927.....	3,083,440	107,417,631	110,501,071
1928.....	2,994,001	89,218,454	92,212,455
1929.....	2,709,169	59,345,233	62,054,402
1930.....	2,483,959	79,000,297	81,484,256
1931.....	2,405,030	74,209,510	76,614,540
1932.....	2,324,246	66,854,214	69,178,460
1933.....	2,311,866	69,793,861	72,105,727
1934.....	2,257,367	70,249,952	72,507,319

† Yearly averages.

(a) In the Savings Bank Act (c. 15, R.S.C., 1927) it is provided that the Minister of Finance shall hold 10 per cent gold reserve against postal savings bank deposits.

The establishment of the Bank of Canada on March 11, 1935, with the consequent changes in the method of holding gold reserves, renders impossible the presentation of a figure for 1935 which would be comparable with those in the above table. A ten-months average from March to December, 1935, shows the following amounts of gold held, in thousands of fine ounces: gold reserves of the Bank of Canada, 5,157; gold reserves of the chartered banks, chiefly gold held abroad, 160; and miscellaneous government gold reserves, 223.

Table 48.—Fine Gold and Fine Silver Shipped to the Royal Canadian Mint, Ottawa, Canada, by Sources, 1935

Provinces	Gold	Silver
	Fine ounces	Fine ounces
British Columbia.....	248,111-607	39,018-53
Alberta sundries.....	150-331	15-74
Saskatchewan sundries.....	9-148	0-45
Manitoba.....	52,085-201	7,562-47
Ontario.....	2,195,386-202	310,104-48
Quebec.....	541,461-912	30,378-42
Nova Scotia.....	9,082-116	371-88
Jewellery and scrap.....	44,932-037	12,232-10
Vancouver Assay Office.....	65,508-547	14,186-48
Yukon sundries.....	2,030-129	534-69
Total.....	3,158,767-230	414,405-24

Table 49.—Gold Consumed by Specified Canadian Industries, 1933, 1934 and 1935

Industry	1933	1934	1935
	\$	\$	\$
Jewellery manufacturers.....	303,398	393,939	595,117
Refiners of secondary gold (x).....	618,740	748,510	1,067,360
Silverware manufacturers.....	3,691	29,303	30,109

(x) Possibly includes some gold reported by manufacturers of jewellery.

Table 50.—World's Monetary Stocks of Gold at the Close of 1933 and 1934

(Subject to Revision)
(Compiled by United States Mint from Available Data)
(Stated in United States Money)

Country	Total Gold Stock Value, 1933*	Per Capita	Total Gold Stock Value, 1934†	Per Capita
	\$		\$	\$
United States.....	4,322,599,000	34.63	8,237,967,000	65.38
Canada.....	(f) 113,880,000	10.97	205,120,000	19.06
Belgium.....	379,960,000	46.56	589,880,000	71.52
Denmark.....	35,689,000	9.94	60,396,000	16.59
France.....	3,022,242,000	72.24	5,444,828,000	129.95
Germany.....	(e) 109,411,000	1.69	(e) 61,402,000	0.94
Great Britain.....	(f) 932,843,000	20.19	(h) 1,584,512,000	33.99
Italy.....	(e) 466,280,000	11.15	517,803,000	12.26
Netherlands.....	370,615,000	45.29	573,090,000	69.13
Norway.....	(e) 38,404,000	13.64	(e) 61,113,000	21.38
Poland.....	(e) 53,359,000	1.66	85,579,000	2.89
Portugal.....	(e) 34,080,000	5.07	67,568,000	9.53
Rumania.....	(e) 59,373,000	3.26	(e) 103,879,000	5.53
Russia (Soviet Union).....	(b)(a) 415,622,000	2.51	(a) 744,030,000	4.43
Spain.....	436,448,000	18.52	(e) 740,812,000	30.56
Sweden.....	(e) 99,416,000	16.06	(e) 159,616,000	25.69
Switzerland.....	385,628,000	93.60	(e) 623,910,000	150.88
British India.....	(e) 164,148,000	0.46	(e) 274,532,000	0.76
Japan (including Chosen, Taiwan, Kwantung).....	(b) 211,894,000	2.29	393,643,000	4.09
Netherland East Indies.....	(b) 43,568,000	0.71	77,249,000	1.22
Egypt.....	30,848,000	2.06	54,776,000	3.60
Australia.....	2,433,000	0.37	(i) 21,546,000	3.24
New Zealand.....	(c) 24,600,000	16.91	24,733,000	16.00
Union of South Africa.....	(e) 126,412,000	15.54	(e) 192,086,000	22.79
Other countries.....	754,974,000	.....	1,076,300,000	.....
Total.....	12,634,726,000	(d) 6.31	21,986,370,000	(g) 10.91

(*) 1 ounce fine gold—\$20.67.

(†) 1 ounce fine gold—\$35.

(a) On Jan. 1, 1934 and Jan. 1, 1935.

(b) Incomplete.

(c) Gold and silver.

(d) World population, principally from U.S. Commerce Yearbook.

(e) In part held abroad.

(f) Contains some silver coin.

(g) World population figures are principally from Statistical Yearbook of the League of Nations, 1934-35.

(h) On December 26, 1934.

(i) Average for quarter ending Dec. 31, 1934, and includes some silver.

Table 51.—Canadian Security Price Index Numbers, 1930-1935

(1926=100)

Month	Canadian Common Stocks						Dominion of Canada Long Term Bond Yields
	(a) Industrials and Utilities			(b) Mines			
	Common Stocks Total	Industrials	Utilities	Mines Total	Gold	Base Metals	
1930							
December.....	103.1	120.3	104.7	59.2	57.8	.....	93.9
1931							
December.....	64.8	74.3	59.3	59.0	59.0	.....	111.7
1932							
December.....	52.2	58.9	45.7	63.1	62.7	.....	99.4
1933							
December.....	75.3	111.4	47.8	105.1	100.4	127.1	95.1
1934							
January.....	81.6	118.6	53.5	108.9	104.7	128.3	93.2
July.....	81.3	116.6	50.6	137.2	133.3	158.3	80.1
December.....	86.2	125.6	47.5	124.9	124.7	129.6	71.3
1935							
January.....	88.6	129.7	50.4	124.3	123.2	132.4	70.9
February.....	87.8	128.8	49.4	124.2	123.4	131.2	73.2
March.....	84.4	125.6	45.1	128.2	127.5	135.3	71.4
April.....	86.4	130.8	43.8	128.7	124.5	140.1	72.2
May.....	93.6	144.4	44.4	128.3	121.4	159.2	71.4
June.....	93.8	145.2	45.0	123.0	116.3	153.2	73.4
July.....	92.4	143.8	44.7	117.9	110.1	151.9	72.1
August.....	94.7	146.1	47.7	115.6	106.2	155.4	71.6
September.....	93.6	147.1	46.3	119.1	109.5	159.6	79.8
October.....	96.1	152.9	45.6	118.6	106.3	169.7	78.9
November.....	105.8	170.3	50.9	125.5	111.8	181.9	74.5
December.....	107.4	178.2	50.1	133.6	116.9	201.7	75.5

THE ALLUVIAL GOLD MINING INDUSTRY IN CANADA, 1935

Placer gold was reported in Canada as early as 1823 when the metal was discovered on the Chaudière river, Quebec. Later, in 1855, alluvial gold was found at the mouth of Pend d'Oreille river, B.C., by the ex-servants of the Hudson's Bay Company and by 1859 placer miners had penetrated to Cariboo and Quesnel. Later years witnessed many important discoveries of placer gold in both British Columbia and the Yukon, the most outstanding of which was the finding of the sensationally rich Klondike deposits in 1896. At the present time the greater part of the Canadian production of alluvial gold comes from the Yukon Territory and British Columbia; smaller amounts are recovered in Alberta and Quebec.

Quebec.—The only placer gold mining operations reported in the province of Quebec in 1935 were those conducted at Rivière des Plantes by Geo. A. Dion. This property was active from May to September, inclusive, and the operations yielded a small quantity of crude gold which was held for future shipment.

Alberta.—Placer gold was discovered on the North Saskatchewan river in 1859 or 1860 and mining has been carried on, chiefly by hand methods and partly by the use of dredges, at intervals down to the present time. The two principal alluvial gold operators in Alberta, the McLeod River Mining Corporation and the Peers Placer Gold Co., Ltd., were both inactive during 1935 and the gold production credited to this province represents the fine metal contained in crude gold shipped to the Royal Canadian Mint, Ottawa.

British Columbia.—In 1935 the British Columbia Department of Labour created a plan whereby unmarried physically fit, unemployed men between the ages of 21 and 25 years, were given an opportunity to learn placer mining. Four placer mining training camps were established; these were located on the Nanaimo river, Emory creek, Cherry creek, and on the Fraser river 10 miles northeast of Quesnel. Gold recovered whilst in training was shared amongst the trainers. The British Columbia Department of Mines reported that placer gold mining and prospecting by individuals, syndicates, and substantial company interests increased during 1935 in No. 1 district, especially in the Atlin area, where a feature has been the inauguration of increased steam-shovel operations and the successful reopening by individuals of old drift workings; facilities for aeroplane transportation were also improved in the district. In district No. 2 a marked growth of activity reflected in the output, featured the year and there was every indication of a sustained increase. The two major operations now in progress, namely, those of Consolidated Gold Alluvials of B.C. Ltd., and Bullion Placers Ltd., exemplify, respectively, the largest "deep-lead" and the largest hydraulic enterprise in the province. Cedar creek witnessed a revival and while placer activity centred mainly in the Cariboo district, in the Omineca mining division, the Manson section was busier than for some years past. Other points at which work was carried on were: Two Brothers lake area; McConnell creek; McDougall river; Lorne, Hankin, and Sauchi creeks.

In districts Nos. 3 and 4 placer prospecting and small-scale individual placer mining operations were about the same as in previous years. The larger operations on Rock creek, Midway creek, and in the Similkameen-Tulameen areas did not report a particularly successful year. Renewed interest has been taken in the old high-bench channels on Scotch creek and Woods Lake benches, where more extensive testing has recently been started.

Placer mining, although it did not contribute greatly to the output of district No. 5, is a matter of widespread interest. The production was largely the recovery made by individual miners or partnerships and in most cases represented hard-earned wages.

For more complete details relating to placer mining in this province, communicate with the British Columbia Department of Mines, Victoria, B.C.

Yukon.—The Comptroller of the Yukon, through the Department of the Interior, Ottawa, submits the following information relating to mining during the fiscal year ending March 31, 1936: The amount of placer gold mined during the year in the Territory on which royalty export tax was paid was 44,564.19 ounces, as follows:—Dawson district, 43,137.98 ounces; Mayo district, 736.56 ounces, and Whitehorse district, 689.65 ounces. The royalty collected was \$16,711.69. In the Dawson district sixty-three new placer location grants, fifty-four relocation grants, and two thousand four hundred and eighty-four renewal grants were issued. Five dredging leases were renewed, covering forty-eight miles. Seven hydraulic leases were renewed. In the Dawson district there is a larger area of alluvial deposits being mined, or being held in good

standing for development, than for many years past. The Yukon Consolidated Gold Corp., Ltd., continued prospect drilling operations from early in April till late in October using two Keystone 71 gasoline drills continuously and one steam drill part of the time; 816 holes were drilled having a footage of 28,276. On the Klondike river area three 16 cubic foot dredges Nos. 2, 3 and 4 operated during the season. No. 1, a 7½ cubic foot dredge, operated on upper Dominion; No. 5, also a 7½ cubic foot dredge, operated at Granville, and No. 7, a 5 cubic foot dredge, operated during the latter part of the season on Quartz creek. A total of 5,222,144 cubic yards was dredged from May 20 to October 25, the shut-down date. Construction work was completed on the 5 cubic foot dredge, designated as No. 7, on Quartz creek, and the boat placed in operation on August 2nd. A large area of practically virgin ground will be prospected by the Company during 1936, and it is reported that the Company expects to undertake a large program of expansion and modernization which will involve an expenditure of several million dollars within the next few years.

The Holbrook Dredging Company continued operations on the Sixty Mile river with a steam dredge, commencing on June 15 and continuing to October 25. During the year there was an increase in individual mining on the old placer creeks throughout the whole Territory and a greater number of individuals continued winter operations than in previous years. Prospecting for placer gold has continued generally throughout the Territory and considerable attention is being given to the remoter parts where planes have been used to transport prospectors and their supplies.

For information relating to mining laws or to geology, etc., of the Yukon, communicate with the Department of Mines and Resources, Ottawa.

Table 52.—Summary Statistics of Alluvial Gold Mining in Canada, 1934 and 1935

	1934			1935		
	British Columbia	Yukon	Quebec and Alberta	British Columbia	Yukon	Quebec and Alberta (d)
Number of firms and individual operators*	85	4	4	80	3	(c)
Time in operation..... months	6-10	6-8	6-8	6-8	6-8	6-8
Capital employed..... \$	2,074,138	10,117,273	2,124,290	4,725,869	4,472,664	(c)
Number of employees.....	352	248	15	422	280	(c)
Salaries and wages paid..... \$	442,957	571,423	13,189	547,479	680,492	(c)
Fuel and electricity used..... \$	29,334	42,139	5,142	32,302	38,232	(c)
Electricity generated for own use.... K.W.H.	325,000	11,926,000	100,000	325,000	13,200,810	(c)
Crude gold recovered..... crude ounces	25,181	48,379	293	30,929	44,632	197
Platinum recovered..... crude ounces	53			39		
Value of platinum recovered..... \$	2,051			780		
Quantity of material handled..... cu.yds.	2,034,522	6,315,070	155,000	1,855,937	5,442,861	(c)
Length of ditches..... miles (b)	124	25		79	70	(c)
Total value of alluvial products (a)..... \$	430,128	822,443	7,912	897,721	1,294,328	5,713

*In addition to the number shown in the table, there were several other small operators from whom no returns were obtainable.

(a) Value of crude gold based on statutory price of the metal (\$20.67) and estimated at \$17 per crude ounce in 1934 and \$29 per crude ounce in 1935, Canadian funds.

(b) Includes flume.

(c) Information not available.

(d) Recoveries in this column represent receipts of crude gold from Alberta at the Royal Canadian Mint, Ottawa.

THE AURIFEROUS QUARTZ MINING INDUSTRY

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of Macenebec river. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller but increasing proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon territories, the gold production from this section was largely of placer origin until recent years. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

The regular annual survey of the operations conducted at lode gold or auriferous quartz mines, as completed for 1935, reveals the increasing economic importance of this industry. These mines now produce approximately 80 per cent of Canada's total gold output. The number of employees engaged in this industry totalled 19,834 in 1935 and salaries and wages paid amounted to \$31,523,907. Fuel, electricity and process supplies purchased for these mines were evaluated at \$16,594,031 in 1935 while in the preceding year the value of these same items together with the cost of new plant equipment, freight, insurance, etc., reached the impressive total of \$23,993,873. The tonnage of ore treated in 1935 totalled 8,907,610 as compared with 7,524,803 in 1934 and 6,480,164 in 1933. It is interesting to note here that the average gold content of quartz ores treated has shown a decrease from 0.41 fine ounce per ton in 1929 to 0.30 fine ounce in 1935. This decrease results directly from the milling of lower grade ores, made economically permissible by the increase in the price of gold and also to a lesser degree by the increasing efficiency in extraction. Dividends reported as being distributed by the auriferous quartz mines in 1935 totalled \$29,430,401 compared with \$27,888,731 in 1934 and \$20,030,200 in 1933.

A communication from the Department of Mines, Ottawa, states that large areas of territory favourable to prospecting for gold will be brought to the attention of prospectors and the mining fraternity as a result of the 1935 Geological Survey work. Exploratory surveys in one area of the Northwest Territories have brought to light some 2,900 square miles of excellent prospecting ground for precious metal deposits. An early result reported from one of the Manitoba projects was the mapping of 200 square miles of favourable gold prospecting ground. Some prospecting areas were also found in Northern Saskatchewan while a British Columbia party found that tests should be made of Tertiary gold-bearing gravels previously overlooked. Favourable zones for prospecting were mapped in the Desbouchés district of Northern Quebec and geological mapping in the Malartic and Lake Chibougamau districts contributed structural information of great value in connection with the development of gold and gold-copper occurrences. Of 1,100 square miles mapped in the Lake Chibougamau-Waswanipi area, it is expected that 40 per cent will be shown as favourable to occurrences of gold and copper.

Nova Scotia.—During 1935 official returns were received from 24 active auriferous quartz mines in Nova Scotia. The number of employees totalled 365 and salaries and wages disbursed amounted to \$317,633. Mining operations were conducted at properties located in the counties of Guysboro, Halifax, Hants, Lunenburg and Queens, while sampling was carried out on auriferous lodes occurring in Victoria county.

A large amount of technical service in all phases of gold mining was rendered during the year to those directly interested in Nova Scotia gold fields and many surveys were carried out for the establishment of permanent base lines in the various gold districts.

The increase in gold production from 3,525 fine ounces in 1934 to 9,376 fine ounces in 1935 reflects the general expansion and renewal of interest in Nova Scotia gold mining and it was predicted that several operators will increase their production during the year 1936. During the period 1862-1935, 2,276,983 tons of gold ore were crushed in Nova Scotia for the recovery of 987,964 ounces of gold.

For particulars relating to geology, mining laws, etc., communicate with the Department of Public Works and Mines, Halifax, N.S.

Quebec.—Gold production in Quebec during 1935 totalled 470,552 fine ounces, representing a 21 per cent increase over the preceding year. This province now ranks second in importance among the gold producing provinces of the Dominion and shows every indication of an increasing output in the near future.

A relatively large proportion of the Quebec gold output is derived from the copper-gold ores of the Horne (Noranda) mine, however, the successful development of auriferous quartz lodes during recent years is becoming an ever important factor in increasing the gold production of the province.

In Western Quebec three new mines came into production in 1935—the Arntfield, the Canadian-Malartic, and the Lamaque. Several others were nearing the production stage such as the Shawkey, the Stadacona-Rouyn, and the Beauplace, the latter being the property developed in Guillet township by the McIntyre Porcupine Mines Ltd.

Exploration and development work was actively carried on in the two mineralized fields discovered in 1934—Currie township or Madeleine Lake, 70 miles north of Senneterre, and Guillet township, 60 miles south of Rouyn.

In the Chibougamau region and in Opemiska area, much work was accomplished in development and exploration. Opemiska Copper Mines Ltd., controlled by Ventures, Ltd., holds promising properties in Levy township, 30 miles west of McKenzie township in Chibougamau. A winter road, 130 miles long, was opened from Langlade station to Levy township, in order to facilitate hauling in a mining plant.

For information relating to geology, mining laws, etc., communicate with the Bureau of Mines, Quebec, Quebec.

Ontario.—The number of auriferous quartz mines reported as active in Ontario during 1935 totalled 120 as compared with 115 in 1934. Salaries and wages paid to 12,778 employees in 1935 amounted to \$21,365,098 as against \$18,918,830 paid to 11,627 employees in the preceding year. The Ontario Department of Mines reports that important developments were undertaken in all gold fields during 1935. In South-eastern Ontario there was a pronounced revival of interest in the older mines located in the gold-bearing belt extending westward from North Lennox-Addington and Frontenac counties to Peterborough county, while in Larder Lake, after several years of idleness, the Omega property, comprising 22 mining claims and formerly owned by the Crown Reserve Consolidated Mines, Associated Goldfields, and Kitchener Kirkland Mines, was taken over and equipment rehabilitated by Castle-Trethewey Mines Ltd. This one operation has stimulated interest in an area very prominent before the investing public during the past two decades. The Eastern Kirkland area (Gull Lake) was also active; at the Lake Shore mine, a new shaft, completed to the bed of the lake, will be sunk to depth; a new internal shaft was under construction at the Wright-Hargreaves and at the western edge of the camp, the Macassa was developing to 3,000 feet in depth. In the Matachewan area a deep shaft was being sunk at the Young-Davidson property; the two other producers in this field were the Ashley and Matachewan Consolidated.

At Porcupine one of the most important developments was the work undertaken by Noranda Mines in the eastern section of the area, where the Pamour property, formerly owned by the Three Nations Mining Company, has responded favourably to a campaign of deep diamond drilling carried on during the summer of 1935. During the latter part of the season the Ontario Department of Mines made a special survey of this section of the area, using the aerial service in preparing the map.

Progress in the mining of auriferous quartz ores throughout the province in 1935 was perhaps most outstanding in the northwestern part of the province where twenty-eight mines, and including such properties as Little Long Lac, Northern Empire, McLeod-Cockshutt, Minto, Parkhill, Pickle Crow, Tashota, Central Patricia, Howey, and McKenzie Red Lake, were active.

Exploration of virgin areas during the year was featured by the discovery of gold-bearing veins on the Sachigo river, located some 40 miles due east of the Ontario-Manitoba boundary and in about the same latitude as God's Lake in Manitoba. This area is roughly 250 miles north of Superior Junction on the Canadian National Railway.

Prospecting and developing was carried on extensively throughout the province, and the Department of Mines for Ontario states that a pleasing feature was the interest maintained in the old established camps where extensions of ore deposits have been generally noted.

For particulars relating to geology, mining laws, etc., communicate with the Ontario Department of Mines, Toronto, Ontario.

Manitoba.—The production of gold in Manitoba during 1935 totalled 142,613 fine ounces, an 8 per cent increase over that in 1934. A relatively large proportion of this metal came from the copper-gold ores of the Flin Flon mine, however, as in the province of Quebec, the successful development of auriferous quartz mines is a factor of increasing importance in the gold production of this province.

The number of employees engaged in auriferous quartz mining and milling totalled 770 in 1935 and salaries and wages amounted to \$1,195,234. The Department of Mines and Resources of the province reported that gold mining again experienced considerable activity in 1935 though prospecting fell off to a great extent. The San Antonio Gold Mines Ltd. continued its dividends during the year while the Central Manitoba and other properties in the Rice, Beresford and Herb Lakes districts reported encouraging results from exploratory operations. God's Lake Gold Mines Ltd. was added to the producers in 1935 and should make an important contribution to the provincial gold output in 1936. Gunnar Gold Mines Ltd. also came into production

early in 1936 and the prospects for an increased gold output in Manitoba for 1936 are considered very favourable.

For particulars relating to geology, mining laws, etc., communicate with the Department of Mines and Natural Resources, Winnipeg, Manitoba.

Saskatchewan.—Gold production credited to Saskatchewan came almost entirely from that part of the Flin Flon mine located west of the Manitoba-Saskatchewan boundary. During recent years considerable work, chiefly of an exploratory nature, was conducted in Saskatchewan on various auriferous quartz veins occurring in the area contiguous to the Flin Flon camp. In 1935, however, attention was principally focussed on the new lode gold discoveries of the Lake Athabasca district. This new gold field is located on the northeast shore of the lake and is quite accessible by rail from Edmonton to Waterways then by river and lake to the properties. A report by Dr. F. J. Alcock of the Department of Mines, Ottawa, states—"The rocks of the region are all of pre-Cambrian age. They include sediments belonging to three different series, granites of two ages and at least one series of basic intrusive rocks. The gold deposits under development are related to the younger granite. The gold occurs in small quartz veins and stringers cutting the granite and also in the granite itself . . . It would appear that there are distinct possibilities that several large tonnage deposits may be found of sufficient grade to mine profitably. The type of deposit is new in the pre-Cambrian in Canada and alters some of our conceptions regarding the mineral possibilities of the northern country".

The Consolidated Mining and Smelting Company of Canada, operating one of the new properties, the Box, situated at Beaverlodge lake (Lake Athabasca field) reported for the year ending December 31, 1935 "that some 10,300 feet of diamond drilling explored for a length of 3,600 feet along the strike, and to a depth of 500 feet along the dip, the mass of granite porphyry which intrudes and is conformable to the series of hornblende schist quartzites. Development is being carried on through 2 shafts, 1,270 feet apart, and it is the intention to continue this exploration to a depth of 500 feet. Results to date are encouraging, and while values are by no means constant, the selection of areas of commercial grade is possible and a position has now been attained where a mill of sufficient capacity to handle the current development stock is justified".

For particulars relating to mining laws, etc., communicate with the Department of Natural Resources, Regina, Saskatchewan.

British Columbia.—The auriferous quartz mines of British Columbia were largely responsible for the 32 per cent increase in the provincial gold output in 1935. Production from this source has largely compensated for the decline in gold recoveries from copper-gold ores suffered as the result of the cessation of mining at Anyox. The lode gold mines of the province provided employment for 2,952 persons in 1935 and distributed \$4,412,634 in salaries and wages.

The British Columbia Department of Mines reported that in District No. 1 normal production was continued at the Premier mine since March 9, 1935, and towards the end of the year an agreement embracing the Silbak-Premier Mines Ltd. was consummated whereby the Premier Company undertakes the further development and operation of the adjoining B.C. Silver and Sebakwe Company holdings. A feature in the Stewart area has been the increasing interest in small operations by individuals or syndicates aiming at small tonnage production of high-grade shipping ore. Interest in this phase of operating is also materializing in the Alice Arm area. Active exploration was carried out on many properties throughout the district and encouraging results indicative of possible production in the near future were achieved at the Big Missouri and White-water; other important operations included exploration of the Salmon Gold at Stewart and the McKay Syndicate property, Unuk river.

In District No. 2 the producing lode-gold properties in the Cariboo district, namely, Cariboo Gold Quartz and Island Mountain, increased their respective rates of milling during the year and it is stated that the results secured by these companies may be considered a sound argument for further well-directed development at other points within the Barkerville gold belt. In the Omineca mining division activities took place on the Zymoetz river; in the vicinity of Usk; at several points on the Hudson Bay Mountain, near Smithers; on Dome and Grouse mountains; near Telkwa; in Whitesail Lake area; and at Aiken lake, where the most northerly lode mining operations in this district are carried on. Individual owners were particularly active developing their properties and making small shipments of ore.

Major interest in Nos. 3 and 4 districts (southern and central) was centred in the search for gold properties and, stimulated by favourable mining developments in the Hedley camp, much

old and new ground was re-examined and prospected. The result was the re-establishment of Hedley as a gold mining camp of importance, with one property (re-opened) producing at the rate of 210 tons or more per day; another property being equipped with mining and milling machinery; and the announcement that one and possibly two new milling plants will be built and placed in operation during 1936. Similar prospecting but on a reduced scale was done in the Osoyoos, Oliver-Fairview, Lightning Peak, Monashee, Vernon, Greenwood, Grand Forks, Summerland-Peachland, Nicola and Windpass areas, and some encouraging gold discoveries were reported.

Development and exploration of lode gold deposits in district No. 5 occurred in the Cranbrook area; at Southern Kootenay lake; in the vicinity of Nelson and Ymir; at Erie creek and in other parts of the district. At Ymir, the Ymir Yankee Girl Gold Mines Ltd., after shipping fluxing ore to the Trail Smelter, was equipped with a mill which came into production on January 18, 1935. A new mill was completed at the Second Relief mine and milling commenced on December 20. Sheep Creek Gold Mines Ltd. commenced production at the old Queen Mine on May 20, 1935, the new cyanide mill being used and 125 to 130 tons of ore were treated daily. Other important mining operations included those of the Gold Belt Mining Co., Kootenay Belle Gold Mines, Ltd., Wesko Exploration and Development Co. Ltd., Wilcox and Reno.

During the period under review most of the mining activity in the Western or No. 6 mineral survey district was concerned with lode gold exploration, development and production. Productive and exploratory operations in the Bridge River camp continue to provide employment for a large aggregate number of men. Work was suspended at some outlying properties, promoted during the boom period, due to lack of funds, or other reasons, but geological investigations which have been made may lead to resumption of work in some cases. Prospecting by individuals, partnerships, and syndicates was generally conducted throughout the district. Total development work at the Pioneer Mine during the year consisted of 6,978 feet of drifting and 2,350 feet of crosscutting, 1,510 feet of raising and 794 feet of shafting. A consolidation of Bralorne Mines Ltd., and Bradian Mines Ltd. was effected in July, 1935. In July, construction was started on a new 100 ton mill by Wayside Consolidated Gold Mines Ltd. Other important mining operations included those of Pacific Eastern Gold Ltd. B.R.X. Gold Mines Ltd., Congress Gold Mines Ltd., Minto Gold Mines Ltd., Federal Gold Mines Ltd., Olympic Gold Mines Ltd., and Grange Mines Ltd.

For particulars relating to geology, mining laws, etc., communicate with the British Columbia Department of Mines, Victoria, B.C.

Yukon and Northwest Territories.—One hundred and eighty-six quartz grants were issued in the Dawson district during the fiscal year ending March 31, 1936. The claims represented by these grants are principally in the Carmacks area. Four hundred and thirty-six claims were renewed.

The N. A. Timmins Corp. relinquished their options on claims on Mount Free Gold, and the Yukon Consolidated Gold Corporation, Ltd., took over the equipment and an option on the "La Forma" group, where the Timmins Corp. had run a tunnel. Fifteen to twenty men were employed throughout the winter carrying on exploratory work on the property. It was reported early in 1936 that the Yukon Consolidated Gold Corp. had now discontinued work at Mount Free Gold.

Two or three small syndicates, and several individuals, prospected on other claims in the district throughout the year. About four hundred claims are being held in good standing in the Mount Free Gold district.

At Yellowknife Bay, Great Slave Lake district in the Northwest Territories, the property of the Burwash Yellowknife Mines Ltd. was active from April until the end of 1935, both surface and underground operations were conducted and a shipment of crude gold ore was made to the Trail smelter for testing purposes. The Northern Miner, Toronto, states—"Mainland stakings last season were largely confined to the vicinity of Rocher river and to isolated sections on the north-eastern coast of Great Slave lake. Stakings in the Yellowknife area show virtually the entire shore line of Yellowknife bay staked to a depth of several miles . . . work was continued on Outpost island throughout the winter months and diamond drilling has borne out the regularity of the structure. A shaft has been started with handsteel on the original Shunsby discovery on No. 13 claim of Slave Lake mines . . ."

For information relating to geology, mining laws, etc., communicate with the Department of Mines and Resources, Ottawa.

Table 53.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1934 and 1935

(Ton—2,000 pounds)

	Nova Scotia	Quebec	Ontario	Manitoba	British Columbia, Yukon and Northwest Territories	Canada
1934						
Number of producing mines.....	10	10	42	5	81	148
Ore mined..... tons	20,400	653,035	6,451,743	132,545	589,131	7,846,854
Ore milled..... tons	14,687	621,984	6,290,836	120,424	427,347	7,476,278
Tailings retreated..... tons			9,092		18,143	27,235
Concentrates produced..... tons	126	24,895	304	348	22,875	48,548
Gold content of ores and concentrates shipped..... fine oz.	192	50,072	4,214	338	103,875	158,691
Bullion recovered by amalgamation..... crude oz.	3,775	95,778	191,317	17,744	51,171	359,785
Bullion recovered by cyanidation..... crude oz.		19,645	2,609,813	34,086	143,089	2,806,633
Bullion shipped..... crude oz.	3,775	115,423	2,784,296	62,040	211,592	3,177,126
Content of bullion shipped—						
Gold..... fine oz.	3,132	98,166	2,039,445	39,217	151,862	2,331,822
Silver..... fine oz.	56	8,061	418,115	6,433	31,081	463,746
Value..... \$	62,377	2,032,084	42,362,320	813,687	3,153,879	48,424,347
Exchange premium on bullion..... \$	41,616	1,283,535	26,497,278	539,376	2,084,059	30,445,864
Value of ores, slags and residues sold..... \$	6,300	1,307,820	140,585	10,880	3,425,644	4,891,222
Total value of all shipments..... \$	110,293	4,623,439	69,000,183	1,363,943	8,663,582	83,761,420
1935						
Number of producing mines.....	12	14	57	7	79	169
Ore mined..... tons	55,366	918,884	6,874,357	183,716	800,578	8,832,901
Ore milled..... tons	36,544	902,842	6,981,936	174,451	792,356	8,888,129
Tailings retreated..... tons			51,341	250	6,207	57,798
Concentrates produced..... tons	415	23,622	1,074	71	29,131	54,313
Gold content of ores and concentrates shipped..... fine oz.	284	20,750	7,467	1,513	123,500	153,514
Bullion recovered by amalgamation..... crude oz.	8,679	116,783	234,016	26,856	53,867	440,201
Bullion recovered by cyanidation..... crude oz.		124,490	2,587,401	52,025	197,910	2,961,826
Bullion shipped..... crude oz.	9,609	238,369	2,827,885	78,760	242,352	3,396,975
Content of bullion shipped—						
Gold..... fine oz.	8,760	187,167	2,143,176	52,575	100,467	2,492,145
Silver..... fine oz.	264	31,434	427,611	7,750	23,179	490,238
Value..... \$	181,242	3,888,947	44,576,965	1,091,694	2,090,274	51,829,122
Exchange premium on bullion..... \$	122,859	2,705,555	30,224,568	315,098	1,391,006	34,759,086
Value of ores, slags and residues sold..... \$	6,564	414,788	238,527	35,686	4,431,032	5,126,597
Total value of all shipments..... \$	310,665	7,009,290	75,040,060	1,442,478	7,912,312	91,714,805
Value of fuel, electricity and process supplies used..... \$	148,142	1,766,558	11,310,006	776,729	2,592,596†	16,594,031
Net value of shipments..... \$	162,523	5,242,732	63,730,054	665,749	5,319,716	75,120,774

NOTE.—The value of fuel, purchased electricity, and process supplies used, was deducted from the value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value, however, freight and treatment charges on all shipments of ores and concentrates have been deducted for all years shown.

† Includes \$14,032 for mines in Saskatchewan.

Table 54.—Ores, Concentrates and Slags Shipped from the Auriferous Quartz Mines in Canada, 1934 and 1935

Item	Nova Scotia, Quebec, Ontario and Manitoba mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
1934					
Number of mines.....	15	4	62	17	98
Tons of ore, etc., shipped.....	3,714	22,347	47,086	22,152	95,299
Metal content—					
Gold.....oz.	7,242	47,574	34,438	69,437	158,691
Silver.....oz.	2,818	27,812	225,119	679,787	935,536
Copper.....lb.	740,899			154,873	895,772
Lead.....lb.			269,713	2,335	272,048
Zinc.....lb.					
Arsenic.....lb.		12,000			12,000
Value*.....\$	225,969	1,239,616	984,713	2,440,931	4,891,229
1935					
Number of mines.....	25	9	55	27	116
Tons of ore, etc., shipped.....	2,852	21,686	22,490	25,631	72,659
Metal content—					
Gold.....oz.	10,112	19,902	39,085	84,415	153,514
Silver.....oz.	28,478	7,444	229,850	683,662	949,434
Copper.....lb.	242,874	2,154		126,829	371,857
Lead.....lb.	20,188		990,017	1,199	1,011,404
Zinc.....lb.					
Arsenic.....lb.					
Value*.....\$	335,541	360,024	1,338,208	3,092,824	5,126,597

*Value f.o.b. cars at mine, less freight and treatment charges only.

Table 55.—Gold Content of Bullion, Ores, Concentrates, etc., Shipped, and Ore Milled by Auriferous Quartz Mines in Canada, with Average Price of Gold in Canadian Funds, 1929-1935

Year	Tonnage treated	Gold content fine ounces	Ounces of fine gold per ton	Average price of gold
1929.....	4,371,143	1,771,526	.41	\$ 20.67
1930.....	4,429,906	1,884,791	.43	20.67
1931.....	5,526,379	2,271,278	.41	21.55
1932.....	5,997,492	2,502,327	.42	23.47
1933.....	6,480,164	2,455,365	.38	28.60
1934.....	7,524,803	2,490,513	.33	34.50
1935.....	8,907,610	2,645,659	.30	35.19

Table 56.—Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada

Name of mine	Develop- ment and exploration	Mining	Milling	Other	Total cost per ton
	\$	\$	\$	\$	\$
Teck Hughes.....	0.78	2.55	1.08	0.76 (e)	5.17
Sylvanite.....	1.37	2.26	1.08	0.91 (d)	5.62
Lake Shore.....	0.40	3.51 (a)	1.26	0.32 (b)	5.49
Hollinger.....	(x)	3.25	0.65	0.58 (e)	4.48
Dome.....	1.20	1.33	(f) 1.00	0.61 (e)	4.14
McIntyre.....	0.67	2.86	0.70	0.12 (d)	4.35
Howey.....	(x)	0.96	(f) 0.45	0.33 (e)	1.74
Pickle Crow.....	2.00	2.92	(g) 2.12	1.03 (e)	8.07
Siscoe.....	1.05	1.10	1.12	1.74 (e)	5.01
Lamaque.....	5.42	1.00	0.97 (h)	3.74 (e)	11.13
Beattie.....	0.47	0.66	0.96	0.23 (e)	2.32
Arntfield.....	0.98	2.49	1.04	1.36 (e)	5.87
San Antonio.....	(x)	3.33	1.40	(x) (e)	4.73
Premier.....	(x)	(x)	(x)	(x)	5.00

NOTE.—The particulars relating to costs have been compiled from the most recent annual printed reports of the various mining companies and the total costs per ton should not be interpreted as being generally comparable as depreciation and certain charges including those for predevelopment, exploration, marketing, taxation, etc., are often treated differently and may or may not be included in the total. The fact that some of the mines listed above commenced milling for the first time in 1935 should also be recognized.

- (a) Includes refining. (b) Year ending June 30, 1935. (c) Year ending August 31, 1935.
 (d) Year ending March 31, 1936. (e) Year ending December 31, 1935.
 (f) Does not include crushing and conveying or ore sorting (Howey).
 (g) Includes ore sorting. (h) Includes depreciation. (x) Not reported separately.

Table 57.—Capital Employed in the Auriferous Quartz Mining Industry in Canada, 1935

Province	Mines		Capital Employed as Represented by:					
	Operating	Producing	Present cash value of the land (excluding minerals)	Present value of building machinery tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
			\$	\$	\$	\$	\$	\$
Nova Scotia.....	24	12	69,335	525,194	32,645	6,333	37,288	670,795
Quebec.....	106	14	18,800,809	7,404,783	999,640	310,062	2,821,498	30,336,792
Ontario.....	120	57	32,775,150	58,499,157	3,708,997	1,299,486	34,702,587	130,985,377
Manitoba.....	20	7	5,527,143	2,185,179	395,963	58,655	715,613	8,882,553
Saskatchewan.....	3	.....	.....	.....	.....	.....	.....	.....
British Columbia*	111	79	9,109,500	7,033,971	743,655	435,287	5,530,872	22,853,285
Total.....	384	169	66,281,937	75,648,284	5,880,900	2,109,823	43,807,858	193,728,502

*Includes one company in the Northwest Territories and one company in the Yukon Territory.

Table 58.—Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1934 and 1935

Province	1934						1935					
	Number of employees					Salaries and wages	Number of employees					Salaries and wages
	On sal- ary	Wage-earners			Total em- ployees		On sal- ary	Wage-earners			Total em- ployees	
		Sur- face	Under- ground	Mill				Sur- face	Under- ground	Mill		
						\$						\$
Nova Scotia.....	27	98	86	23	234	198,657	33	116	173	43	365	317,633
Quebec.....	376	1,031	754	110	2,271	2,957,352	358	1,327	1,065	160	2,910	4,153,178
Ontario.....	798	3,030	7,043	756	11,627	18,918,830	921	3,163	7,807	887	12,778	21,365,098
Manitoba.....	103	377	269	49	798	1,125,922	95	324	309	42	770	1,195,234
Saskatchewan.....	2	9			11	8,367	7	34			59	80,130
British Columbia.....	317	981	1,350	173	2,821	3,947,759	299	899	1,412	342	2,952	4,412,634
Canada.....	1,623	5,526	9,502	1,111	17,762	27,156,887	1,713	5,863	10,784	1,474	19,834	31,523,907

Table 59.—Wage-Earners, by Months, in the Auriferous Quartz Mining Industry* 1933-1935

Months	1933	1934	1935
January.....	10,764	13,329	16,356
February.....	10,815	13,540	16,342
March.....	10,808	13,897	16,737
April.....	10,918	14,516	17,207
May.....	11,229	15,556	17,656
June.....	11,836	16,404	18,281
July.....	12,381	17,145	18,784
August.....	12,754	17,734	19,372
September.....	12,636	18,187	19,270
October.....	13,060	18,342	19,770
November.....	12,841	17,712	19,292
December.....	12,443	16,938	18,645

The Copper-Gold-Silver Mining Industry

The mining of copper-gold-silver ores in 1935 was confined to the provinces of Quebec, Manitoba, Saskatchewan and British Columbia. It is to be noted, however, that a considerable quantity of gold is recovered from copper-nickel ores mined in the Sudbury area of Ontario; statistics relating to this industry are contained in the chapter "Nickel-Copper Mining and Smelting". A summarized review of the copper-gold mining industry in Canada, by provinces, follows:—

Quebec.—At Eustis, in the Eastern Townships, the Consolidated Copper and Sulphur Co., operated its mine and mill throughout the entire year; 74,073 tons of ore were raised and milled, from which was produced 9,849 tons of copper concentrates and 35,742 tons of iron pyrites concentrates. The mill products of this company are exported to the United States and no gold values are reported as contained in the shipments.

No underground work since February, 1935, was carried on at the property of the Normetal Mining Corp., Ltd., located in Desmeloizes township, Abitibi county. Further metallurgical tests were made and early in 1936 a complete geological examination by an independent engineer was being made. Plans were then being formulated so that the mine could be put into production when conditions warrant, with a minimum of delay.

In Montbray township, Robb-Montbray Mines Ltd., conducted some underground operations early in the year and a shipment of crude ore was made to the Noranda smelter.

At the Horne mine, Noranda Mines Ltd., completed a new five compartment shaft from the surface to a depth of 2,164 feet which is being extended full size to the 2,975 foot level. Ten thousand one hundred and sixty-eight feet of drifting, 4,471 feet of raising in rock and 47,257 feet of diamond drilling were completed and 267,733 cubic feet of rock excavated in cutting stations and widening drifts and ore passes. General exploration was somewhat curtailed and was largely confined to the search for and development of silicious gold ore which is used for flux in the smelter. Further exploration of the "lower H." orebody was carried out by driving a number of parallel crosscuts through it on the 2,725 foot and 2,975 foot levels and this more detailed

work confirmed the general situation indicated by diamond drilling done in 1935. On the 2,725 foot level the massive sulphide ore averaged 6.11 per cent copper and 0.32 ounces of gold per ton over a length of 500 feet and average width of 105 feet. A zone approximately 500 feet long and 400 feet wide underlying the "lower H" orebody was partially explored to a depth of about 500 feet below the 2,975 foot level by eleven diamond drill holes in most of which scattered gold assays indicating fluxing ore were obtained. When the new No. 5 shaft is completed to the 2,975 foot level, sinking will be resumed and further exploration of the ground below the 2,975 foot level will be undertaken.

From the information obtained in drifting, diamond drilling and other openings in various orebodies, there is now indicated above the 2,975 foot level the following tonnage of ore:—

	Tons	Copper per cent	Gold, ounces per ton
Sulphide ore over 4% copper.....	7,333,000	7.54	0.174
Sulphide ore under 4% copper.....	20,457,000	0.99	0.190
Silicious fluxing ore.....	3,230,000	0.73	0.137

The tonnage and average grade of ore delivered from the Horne mine to the smelter and concentrator in 1935 were as follows:—

	Tons	Copper per cent	Gold, ounces per ton	Silver, ounces per ton
Direct smelting sulphide ore.....	429,178	3.08	0.250	0.38
Concentrating sulphide ore.....	1,050,131	2.52	0.133	0.35
Silicious fluxing ore.....	427,352	0.31	0.129	0.12
Total.....	1,906,661	—	—	—

During 1935 the smelter treated 1,076,232 tons of ore, concentrates and refinery slag and produced 77,027,969 pounds of anodes, the average analysis of which was 99.37 per cent copper, 6.97 ounces gold per ton, and 14.95 ounces silver per ton but after deducting the amount of copper, gold and silver in the refinery slag that was smelted, the estimated net production of new copper, gold and silver was 74,478,436 pounds of fine copper, 265,538 ounces of gold, and 544,559 ounces of silver.

In 1935 the Noranda concentrator treated 1,048,806 tons of ore from the Horne mine from which 213,487 tons of concentrates were produced and sent to the smelter. The new 500 ton cyanide mill, designed to retreat the pyrite portion of the flotation mill tailing, was completed during the year and started up in May; this plant recovered 4,597 ounces of gold from 89,610 tons of pyrite treated.

The Bagamac Rouyn Mines Ltd., completed a considerable amount of diamond drilling at its property in Rouyn township and in the Chibougamau district, Lake Dore Mines Ltd., was active from March to October. The Waite-Amulet and Aldermac Mines remained closed during the year; at the Opemiska Mine prospecting resulted in the discovery of a new copper zone about 2,000 feet east of the known showings; the shaft at this property was started in March, 1936, and will be sunk to the 150 foot level from where will be developed the North and No. 1 zones; No. 2 zone will either be developed or diamond drilled from the 150 foot level.

Manitoba and Saskatchewan.—Production of copper-gold-silver ores in the provinces of Manitoba and Saskatchewan during 1935 came entirely from the Flin Flon mine of the Hudson Bay Mining and Smelting Co., Ltd. This property is rather unique in that the interprovincial boundary between the provinces passes through the deposit and production by the company is divided between Manitoba and Saskatchewan, according to the location of ore mined.

There was no production at the Sheritt Gordon mine in Manitoba in 1935 but it was reported early in 1936 that the company would sink the main or central shaft a further 300 feet to a depth of 1,100 feet and establish a level at 1,000 feet. The work was to be commenced in May.

In 1935 the Hudson Bay Mining and Smelting Co., Ltd., completed a very considerable amount of work at the Flin Flon mine in order to prepare for eventually producing the entire tonnage from underground and at the end of the year approximately 45 per cent of the tonnage treated per day came from underground. The average daily tonnage of ore mined throughout

the year from underground was 1,950 tons and there was delivered from underground to the mill during the year, 711,918 tons of ore; the average daily tonnage of ore mined throughout the year from the open pit was 2,488 tons and there was delivered from the open pit to the mill during the year, 903,340 tons of ore and in addition, 4,945 tons of direct smelting ore was sent direct to the smelter as fettling material.

There was treated by the concentrator during 1935 an average daily tonnage of 4,431 tons of ore or a total for the year of 1,617,438 tons, or approximately the same as in 1934. This ore averaged—gold, .089 fine ounce, silver, 1.31 fine ounces, copper, 1.89 per cent, and zinc, 4.2 per cent. From this tonnage was produced 291,459 tons of copper concentrates assaying—gold, 0.318 ounce, silver, 4.52 ounces, copper, 9.06 per cent, and 93,220 tons of zinc concentrates assaying—gold, 0.070 ounce, silver, 1.81 ounces, copper, 0.85 per cent, and zinc, 45.2 per cent.

There was treated by the cyanide annex in 1935, 1,043,944 tons of sulphide ore tailings from which was recovered, in the form of zinc dust precipitate, 12,476 ounces of gold, 135,438 ounces of silver, and 58,298 pounds of copper; this material was sent to the copper converters.

There was treated by the zinc plant during the year, 88,862 tons of zinc concentrates from which was produced for sale 60,104,700 pounds of zinc.

The final experimental work was done on the cadmium precipitate during the year and there was designed a plant to recover the metals contained in the cadmium precipitate; this plant will start production in 1936.

The copper smelter was operated continuously during 1935 and there was treated in the reverberatory, 301,790 tons of Flin Flon ore and concentrates and in addition, 232 tons of miscellaneous customs ores and concentrates. There were produced and shipped, 24,950.12 tons of blister copper containing—gold, 104,218 fine ounces, silver, 1,407,235 fine ounces, copper, 49,267,196 pounds, selenium, 78,006 pounds, and tellurium, 9,411 pounds. The average tonnage of new material treated per day by the smelter was 894 tons.

British Columbia.—The Britannia Mining and Smelting Co., Ltd., is now the principal producer of copper ores and concentrates in British Columbia. The Britannia mine, located on Howe Sound, operated continuously during 1935 and as in the preceding year a great part of the tonnage was mined from the East Bluff section by the low-cost Britannia method of powder-blast mining. This production represented 72 per cent of the total with Victoria West Bluff and Fairview mines producing the balance. A total of 817,250 tons was mined and milled. Total production was 14,306,105 pounds of copper 11,649 ounces of gold and 71,357 ounces of silver. The pyrite-concentrate production amounted to 39,582 tons and the zinc concentrate production totalled 3,191 tons yielding 3,606,436 pounds of zinc. Development work totalled 9,541 feet and early in 1935 the 4,100 haulage adit to develop the property about 200 feet above sea level was recommenced.

Ores of the Rossland camp are valued chiefly for their gold content, silver is also present usually with low values in copper. Production in 1935 by lessees at the Rossland mines of the Consolidated Mining and Smelting Company was approximately 32,900 dry tons containing \$680,000 gross value in gold and silver. Some 120 individuals and partnerships, leasing section of company mines, made shipments to the smelter. Production from these leases and from independent mines in the vicinity reached very considerable proportions, exceeding the volume of such ore which could be handled economically at Trail and resulted in the accumulation of Rossland ore in the yards at the smelter.

The Granby Consolidated Mining Smelting and Power Co., Ltd., closed down its Anyox operations in August 1935 and the company went into voluntary liquidation. The cessation of operations by this old company will result in a very heavy decrease in both the volume and value of British Columbia copper production.

Table 60.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1935

CAPITAL EMPLOYED, as represented by:

(a) Present cash value of the land (excluding minerals).....	\$ 9,111,562
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	\$ 16,884,173
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	\$ 1,523,377
(d) Inventory value of finished products on hand.....	\$ 2,483,264
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	\$ 8,459,306
Total.....	\$ 38,461,682

Number of operating mines.....	18
Number of producing mines.....	10

Table 61.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, 1934 and 1935

	1934		1935	
	Number	Salaries and wages	Number	Salaries and wages
SALARIED EMPLOYEES—		\$		\$
Total.....	204	446,799	236	528,416
WAGE-EARNERS—				
Surface.....	747	4,423,002	999	4,511,780
Underground.....	1,874		1,721	
Mill.....	344		474	
Total.....	2,965	4,423,002	3,194	4,511,780
Grand Total.....	3,169	4,869,801	3,430	5,040,196

Table 62.—Wage-earners by Months in the Copper-Gold-Silver Mining Industry, 1933, 1934 and 1935

Month	1933	1934	1935
January.....	2,657	2,813	3,238
February.....	2,298	2,827	3,327
March.....	2,398	2,817	3,323
April.....	2,565	2,856	3,318
May.....	2,651	2,958	3,408
June.....	2,678	2,928	3,456
July.....	2,726	2,985	3,310
August.....	2,867	3,104	2,947
September.....	2,826	3,122	2,938
October.....	2,878	3,088	3,004
November.....	2,807	3,147	3,023
December.....	2,798	2,930	3,033

Table 63.—Shipments from Copper-Gold-Silver Mines of Canada, 1934 and 1935

	Quantity	Net value (a)	Total metal content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
	Tons	\$	Fine oz.	Fine oz.	Pounds	Tons	Pounds
1934							
8 mines shipped to Canadian plants—							
Ores.....	868,467	829,308	162,797	282,391	33,173,070		
†Copper concentrates.....	553,515	5,769,226	194,664	1,918,638	120,185,486		
Zinc concentrates.....	76,149	451,563	5,417	144,559	1,324,297		69,331,636
Iron pyrites concentrates.....	1,199	3,769				593	
2 mines shipped to foreign plants:							
Ores.....							
Copper concentrates.....	31,866	1,039,511	11,261	79,358	15,348,073		
Zinc concentrates.....	5,889	72,493					6,316,263
Iron pyrites concentrates.....	35,957	99,201	2,889		84,697	4,908	
Total.....	1,573,042	8,265,071	377,028	2,424,946	170,115,623	5,501	75,647,899
1935							
9 mines shipped to Canadian plants—							
Ores.....	900,761	1,523,517	184,410	306,978	33,243,785		
†Copper concentrates.....	578,307	11,256,751	216,014	1,889,856	123,827,169		
Zinc concentrates.....	93,195	2,414,721	6,482	168,298	1,591,696		84,283,903
Iron pyrites concentrates.....	1,149	3,710				580	
2 mines shipped to foreign plants—							
Ores.....							
†Copper concentrates.....	62,356	1,356,861	13,826	86,864	19,410,963		
Zinc concentrates.....	3,191	49,696					3,606,436
Iron pyrites concentrates.....	28,056	71,191				13,942	
Total.....	1,667,015	16,676,447	420,732	2,451,996	178,073,613	11,522	87,890,339
Value of process supplies, etc (b).....		3,433,284					
Net Value.....		13,243,163					

† Includes some cyanide precipitate.

(a) See footnote, table 19, Chapter 1.

(b) The cost of fuel, purchased electricity and process supplies was deducted for the first time in 1935; however, values for all years are less freight and treatment charges.

Table 64.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, 1934 and 1935

	Quebec, Manitoba, and Sask- atchewan	British Columbia	Canada
	tons	tons	tons
1934			
Ore mined.....	3,359,588	2,706,104	6,065,692
Ore milled.....	2,489,392	2,637,797	5,127,189
Tailings re-treated.....	921,388	.....	921,388
Copper concentrates produced.....	443,878	143,167	587,045
Pyrite concentrates produced.....	53,938	26,746	80,684
Zinc concentrates produced.....	76,149	5,662	81,811
1935			
Ore mined.....	3,602,601	2,048,064	5,650,665
Ore milled.....	2,740,317	1,953,070	4,693,387
Copper concentrates produced.....	514,795	100,147	614,942
Copper precipitates produced.....	.....	785	785
Pyrite concentrates produced.....	35,742	30,958	66,700
Zinc concentrates produced.....	93,220	3,246	96,466

CHAPTER III

THE SILVER MINING INDUSTRY IN CANADA

Including the Silver-Cobalt Mining Industry, the Silver-Lead-Zinc Mining Industry, and Commodity Statistics Tables on Arsenic, Cobalt, Silver, Lead and Zinc.

1. General Review.
2. The Silver-Cobalt Mining Industry.
3. The Silver-Lead-Zinc Mining Industry.
4. Commodity Statistics—including tables showing production by provinces, imports exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc.

Definition of the Industry.—Silver mining in Canada is not a distinct mining industry in as much as silver or silver-bearing minerals usually occur in association with other metals of economic value; with lead and zinc; with cobalt, nickel and arsenic; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear lake, N.W.T., with uranium and radium. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. Some years ago the mining of silver-lead-zinc ores in Eastern Canada attained a position of considerable importance in the provinces of Ontario, Quebec and Nova Scotia and it is gratifying to record a renewal during 1935 and 1936 in the mining of these ores in the two provinces last referred to. It is to be noted that in addition to its recovery from silver-lead-zinc ores, zinc is now produced in large quantities from the copper-gold-silver ores of the Flin Flon mine located on the Manitoba-Saskatchewan boundary. Zinc concentrates are also produced in British Columbia from copper-gold-silver ores by the Britannia Mining and Smelting Co., Ltd.; the metal also occurs in commercial quantities with copper-gold-silver ores in Quebec.

The silver-cobalt deposits of northern Ontario possess certain characteristics that are radically different from those deposits containing the common commercial lead-zinc bearing minerals, for this reason, and for statistical purposes, silver mining has been divided into two broad divisions—"The Silver-Cobalt Mining Industry" and "The Silver-Lead-Zinc Mining Industry".

1. General Review

Statistics on the production of silver in 1935 from Canadian ores include (a) silver contained in silver and gold bullion produced, (b) silver contained in blister copper or lead bullion made, and (c) silver estimated as recoverable from ores, matte, etc., exported for treatment in foreign smelters.

Figures on lead for 1935 include lead contained in base bullion made at the Trail smelter in British Columbia and lead estimated as recoverable from ores exported from mines in the Yukon, Quebec, and British Columbia. Small quantities of lead, recovered by the smelters treating cobalt or pitchblende-silver ores are also included.

Canada's 1935 zinc output comprised refined metal produced by the Consolidated Mining and Smelting Company at Trail, B.C., and the Hudson Bay Mining and Smelting Company at Flin Flon, Manitoba, together with the zinc contained in ores exported.

For two decades the ores of the Cobalt district of Ontario had been the main source of the world's supply of cobalt, but since 1926, owing to the production of cobalt by the Union Minière du Haut Katanga, from Central African copper-bearing ores, Canada's production was reduced to less than half of the world's output.

From 1904 to 1910 the Canadian cobalt production figures represent an estimate of the cobalt content of the ores shipped from the mines. From 1911 until the present time cobalt production is computed by adding the cobalt metal and the cobalt content of all cobalt oxides and salts manufactured and sold by the Ontario smelters to the cobalt paid for in ores and residues exported for treatment in foreign smelters.

Arsenic is produced in Canada from the cobalt-silver-nickel-arsenic ores of the Cobalt district by the smelter of the Deloro Smelting and Refining Company Limited, at Deloro, Ontario. Prevailing low prices and an instability of demand have prevented any consistent expansion in the production of arsenic in Canada during recent years.

History pertaining to the discovery and development of these various ores in Canada is summarised in previous reports issued by the Bureau of Statistics.

In 1935 the primary production of these metals from all Canadian sources was as follows:—silver, 16,618,558 fine ounces valued at \$10,767,148 as compared with 16,415,282 fine ounces at \$7,790,840 in 1934; lead, 339,105,079 pounds worth \$10,624,772 as against 346,275,576 pounds valued at \$8,436,658 in 1934; zinc, 320,649,859 pounds at \$9,936,908 compared with 298,579,683 pounds worth \$9,087,571 in 1934; cobalt, 681,419 pounds at \$512,705 compared with 594,671 pounds valued at \$592,497 in 1934; and arsenic, 2,558,789 pounds at \$75,326 as against 1,647,513 pounds worth \$56,412 in the preceding year.

For the second year in succession the quantity of zinc produced in Canada established a new all-time high record representing a 7.4 per cent increase over 1934 and the value of the 1935 output comprised 4.5 per cent of that of the entire Canadian metal production. Although the quantity of lead produced showed a decline of 2 per cent below 1934 the value, reflecting an increase in metal prices, was 26 per cent greater. The quantity of silver produced showed relatively little change from 1934 but the higher average price for the metal during 1935 resulted in a 3.8 per cent increase in the total value of silver produced. The value of silver and lead productions during 1935 comprised 4.9 per cent and 4.8 per cent, respectively, of the total value of all metals produced in the Dominion.

As a producer of silver Canada ranked third in 1935 among the silver producing countries of the world, being surpassed in the order of their outputs by Mexico and the United States; in the production of metallic zinc the Dominion was credited with third position in 1935 being exceeded only by the United States and Belgium, however, in the production of zinc ore Canada was probably exceeded only by the United States, Belgian production largely representing the recovery of metal from imported ores.

In the order of their production the leading lead producing countries of the world in 1935 were the United States, Australia, Mexico and Canada.

The generally upward movement in Canadian zinc prices was accelerated following the change in the basis of British duty on zinc from 10 per cent ad valorem to 12½ shillings per ton. Production increased in most countries as no restriction measures were in force, although rumours of the renewal of the zinc cartel were prevalent from time to time.

Zinc, domestic, prime, western or f.o.b. grades averaged \$3.99 per cwt. in 1935 against \$4.06 per cwt. carlots, f.o.b. Montreal in 1934. The zinc sheet base price in 1-10 casks, f.o.b. Montreal, was 5.3 cents as against 5.5 cents per pound in 1934.

Price advances in lead came largely as a reaction to an improved statistical position. Consumption increased and the output was limited somewhat by an informal agreement among principal producers. Domestic lead advanced from \$3.41 to \$4.81 per 100 pounds carlots, f.o.b. Montreal. Lead pipe averaged 11.1 cents per pound net at Montreal in 1935 compared with 11.3 cents per pound in 1934.

Speculative buying was very active in silver markets in the first half of the year. Early in February lows were established at both New York and London which were not again reached till the December collapse; by the middle of February, a definite reaction was apparent, and the upward movement gained momentum till April 26 when peak prices at 81 cents in New York and 36½ d. per ounce in London were reached. In the meantime (April 24) in order to compete with world markets, the United States Treasury advanced the price of newly mined silver to 77.57 cents per ounce. As no further rise in the official United States price followed, the records established on the 26, weakness developed and the following day quotations at New York and London dropped sharply by 4½ cents and 1½d., respectively. From then onward prices were influenced greatly by the reformed buying policy of the United States Treasury. Acquisitions by the United States government advanced from 307.1 in 1934 to 543.8 millions in 1935. Fine silver at New York averaged 64.8 cents per ounce (Canadian funds) in 1935 and 47.5 cents per ounce in 1934.

Quotations for arsenic, cobalt and cobalt oxide were nominal in nature and were essentially the same as for 1934.

2. The Silver-Cobalt Mining Industry.

Only mining and milling are considered in this chapter. Smelting of the cobalt ores, in so far as the Canadian operations are concerned, is treated in the chapter on "The Non-Ferrous Smelting and Refining Industry".

The mining of silver-cobalt-arsenic ores in Canada is confined to northern Ontario. Since 1921 the annual volume of production has fluctuated to a considerable extent and in 1935 the total silver production of Ontario amounted to 5,161,651 fine ounces of which the cobalt-silver ores contributed 2,466,157 fine ounces and the nickel-copper ores of the Sudbury area 2,243,746 fine ounces.

The Ontario Department of Mines reported that the silver mining industry brightened considerably in Ontario during 1935, due in part to the improved price of the metal and more stable industrial conditions with a consequent better market for the metal cobalt which is associated with the silver in certain Ontario ores. The recovery of silver from nickel-copper ores has increased considerably during recent years and has offset, to a great extent, the decline in the recovery of silver from the cobalt-silver ores.

During 1935 twenty-seven properties shipped silver-cobalt and cobalt ore, 18 of these being located at Cobalt, namely—Cobalt Properties, Temiskaming, O'Brien, Foster, Crown Reserve, Drummond, Beaver, Right-of-Way, Colonial, Nipissing, Cobalt Comet Cobnor, Hudson Bay, Yorkshire Cobalt, Dominion Reduction Company (clean-up), Silver Queen, and Silver Cliff; in South Lorrain, the Wettlaufer, Belorrain, Canadian Lorrain, Frontier, Keeley, and Nipissing Lorrain. In Gowganda shipments were reported from the Miller Lake-O'Brien, Tonopah and Morrison. In most cases these operations were carried on by lessees and the shipments ranged from one ton, a carload lot, or to more than 4,000 tons as in the case of the Nipissing; some of these shipments represented ore treated in local customs mills.

Shipments of silver and cobalt ores over the Temiskaming and Northern Ontario Railway during 1935 totalled 5,036 tons and of these 2,155 tons represented silver ore consigned to Canadian smelters, 2,570 tons of cobalt ore to Canadian smelters or Eastern ports and 312 tons to the United States.

Table 65.—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1924, 1934 and 1935

	1924	1934	1935
Number of mines in operation (x).....	34	16	28
Ore mined..... tons	433,176	54,498	57,287
Ore treated..... tons	428,509	52,337	42,934
Concentrates produced..... tons	7,360	795	952
Quantity of material cyanided..... tons	168,193		
Bullion recovered..... fine oz.	5,577,875	(a) 8,525	(a) 29,563
Bullion sold or shipped..... fine oz.	5,004,992	202,535	1,158,986
Value of bullion, ore, concentrates and residues sold..... \$	3,369,664	1,380,318	(b) 2,070,716

(x) All mines located in Northern Ontario.

(a) From direct smelting of nuggets, etc.

(b) The cost of fuel, electricity and process supplies used was deducted for the first time in 1935 therefore the net value for 1935 is not comparable with those of previous years.

Table 66.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1934 and 1935

	1934	1935
Capital employed as represented by:—	\$	\$
(a) Present cash value of the land (excluding minerals).....	275,502	2,988,230
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		437,158
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....		261,298
(d) Inventory value of finished products on hand.....	485,462	350
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	4,080,229	2,792,501
Total.....	5,102,491	6,380,731

Table 67.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1934 and 1935

	1934		1935	
	Number	Salaries and wages \$	Number	Salaries and wages \$
SALARIED EMPLOYEES— Total.....	30	78,013	40	95,929
WAGE-EARNERS—				
Surface.....	92	283,713	127	398,862
Underground.....	132		191	
Mill.....	32		44	
Total.....	256	283,713	362	398,862
Grand Total.....	286	361,726	402	494,791

Table 68.—Number of Wage-Earners on Payroll or Time Record, on the 15th of Each Month or Nearest Representative Date, in the Silver-Cobalt Mining Industry in Canada, 1933-1935

Month	1933	1934	1935
January.....	208	234	299
February.....	203	233	297
March.....	201	230	288
April.....	204	219	284
May.....	204	235	319
June.....	206	257	375
July.....	205	262	428
August.....	228	269	441
September.....	236	270	448
October.....	236	308	414
November.....	233	281	408
December.....	225	277	360

3. The Silver-Lead-Zinc Mining Industry.

CANADA

Silver-lead-zinc ores are widely distributed in Canada. Deposits containing these metals have been either investigated or developed in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, British Columbia, the Yukon and the Northwest Territories. The mining and metallurgical treatment of this type of ore is largely confined to British Columbia where the growth of this particular branch of the mining industry is closely associated with the successful development and treatment of the Sullivan mine ores by the Consolidated Mining and Smelting Company of Canada.

Shipments of silver-lead-zinc ores were made during 1935 from mines located in Quebec, British Columbia and Yukon Territory. Zinc or lead ores have also been mined in Ontario at Galetta, near Sudbury, and in Frontenac and Hastings counties. Silver-pitchblende ores are now being mined in the Northwest Territories, general statistics pertaining to which are included with those for the silver-lead-zinc industry.

NOVA SCOTIA

In October, 1935, the British Metals Corporation of Canada Ltd., recommenced operations at the Sterling mine, Richmond county. Preparations were made for unwatering the mine and the mill prepared for production. Shipments of lead-zinc concentrates commenced in July, 1936.

QUEBEC

Lead and zinc production in the province of Quebec during 1935 came entirely from the Têtréault mine in Portneuf county. This is the first output of zinc in Quebec in four years and of lead in five years. Both surface and underground operations were conducted throughout the year while the mill was in operation for a total of 308 days; silver-lead-zinc concentrates were consigned to smelters in Belgium.

In addition to the operations conducted at the Tétreault property, there was a considerable amount of surface work carried out on lead-zinc veins occurring in Lemieux township, county of Gaspé. Zinc bearing ores also occur in the Rouyn district of Northwestern Quebec, the metal here being associated with copper and iron pyrites as at the Flin Flon mine in Manitoba and the Britannia mine in British Columbia.

BRITISH COLUMBIA

British Columbia holds a predominant position among the silver-lead-zinc producing provinces of the Dominion. The tonnage of these ores mined in the province during 1935 totalled 2,019,772 or 94.6 per cent of the Canadian total.

The Sullivan mine of the Consolidated Mining and Smelting Company of Canada, Ltd., located in the East Kootenay district, is Canada's greatest producer of silver-lead-zinc ores and the operations of this company are a most important factor in the economic life of the province. Production at the mine during 1935 amounted to 1,861,245 tons comprising 1,859,171 tons of lead-zinc ore shipped to the concentrator at Kimberley and 2,074 tons of crude lead ore to the smelter at Tadanac, an increase of 112,844 tons over the production of 1934. The concentrator treated 1,859,221 tons, an average of 5,959 tons per day and produced 226,837 tons of lead concentrates and 209,078 tons of zinc concentrates. General underground development maintained the fully developed ore reserves of the previous year, which on recalculation indicated a lead-zinc ratio of 1.5554 lead to 1 zinc. Filling operations were commenced during the year, using surface material. Metal production of the company in 1935 was as follows: gold, 65,131 ounces; silver, 7,594,366 ounces; lead, 328,658,528 pounds; copper, 637,084 pounds; zinc, 239,679,806 pounds; cadmium, 551,199 pounds, and bismuth, 6,718 pounds. Dividends and a bonus of four dollars a share, aggregating \$4,232,452 were declared and paid to shareholders during the year, the remainder \$74,107, being carried to earned surplus account, which amounted to \$1,831,108 at the end of 1935.

In the Slocan-Ainsworth camp, the Western Exploration Co. Ltd. commenced milling in July; lead concentrates were at first shipped to Trail and later to Europe. Other noteworthy operations in this area were those conducted by Noble Five Mines Ltd., the Ross Mining Syndicate and the Slocan-Monitor Silver Mines Ltd.

The mill at the Monarch mine of Base Metals Mining Corporation, located at Field, was closed February 16, 1935, and again started on June 25 and continued in operation until approximately December 5, 1935. On September 4, 1935, the direction of Base Metals Mining Corporation was taken over by the Mining Corporation of Canada which announced in July, 1936 that extensive diamond drilling was being conducted at the property.

Other important silver-lead-zinc mining operations conducted in the province during 1935 included those of Allco Silver Mines Ltd., Beaverdell Wellington Syndicate Ltd., Beaver Silver Mines Ltd., Bell Mine Ltd., Bosun; Cunningham Mines Ltd., Dunwell Mines Ltd., Kamloops Homestake Mines Ltd., Highland Lass Ltd., Meridian Mining Co., Ltd., Nicola Mines and Metals Ltd., and Sally Mines Ltd. Ore shipments were also made during the year from numerous small mines operated in various areas throughout the province.

For information relating to mining laws, geology, etc., communicate with the British Columbia Department of Mines, Victoria, B.C.

NORTHWEST TERRITORIES

Eldorado Gold Mines Ltd., operating on silver-pitchblende ores at Great Bear Lake, reported that "during 1935 mining was confined to the development of No. 2 vein on the 125 foot level and the 250 foot level (below the adit level). Underground operations were concentrated largely on the preparation of drifts for stoping the ore above these levels and providing a broken ore reserve above the first level. On the 125 foot level of the No. 2 vein, 583.6 feet of drifting and 139 feet of crosscutting were completed; four stopes were opened up on this level with lengths as follows: 145 feet, 57 feet, 210 feet and 51 feet. Two of these stopes were completed at the end of the year, providing a broken ore reserve of 8,446 tons with a valuation of \$622,921 based on the then market prices of silver, radium and uranium compounds. On the 250 foot level there was completed 416 feet of drifting, 56 feet of crosscutting and 44 feet in stations; drifting west of the shaft on this level disclosed two ore shoots with lengths of 66 feet and 58 feet. The company reported broken ore reserves at 8,446 tons with a gross value of \$622,921 and 8,920 tons of unbroken ore with a gross value of \$1,056,963 (December 31, 1935). The mill treated a total of

14,402 tons during 1935 and of this tonnage 2,560 tons came from development headings. Pitchblende and silver concentrates produced totalled 296 tons valued at \$752,918 (December 31, 1935). The treatment of silver was improved with the installation of five Deister tables and the addition of four flotation cells to those already in use. On June 20, 1936, it was announced that additional power was provided for the mill and the tonnage treated increased to 75 tons per day. Also, approximately 160 tons of pitchblende and silver concentrates had been produced to date, which had a value in excess of \$480,000 at the then market prices of silver, radium, and uranium compounds".

The Consolidated Mining and Smelting Company of Canada, Ltd., reported in February, 1936, that "development on the 125 foot level of its Great Bear lake property, N.W.T., was sufficiently encouraging to justify further exploration at greater depth and a lower crosscut tunnel has been driven at the elevation of the 350 foot level. At their intersection by the crosscut, the veins developed on the upper level were rather narrow and not so well mineralized. Drifting on the two more promising veins was under way in the hope of confirming the results obtained on the 125 foot level. Values are in silver, which occurs native and in various compounds associated with chalcopyrite, galena, pyrite and nickelite. Occasional bunches of pitchblende have been encountered but nothing of commercial importance".

El-Bonanza Mining Corp., conducted extensive development work throughout 1935 and reported a small shipment of silver ore to the Trail smelter in British Columbia; Bear Exploration and Radium Ltd., was also in continuous operation during the year; 58 tons of ore were milled but no shipments reported.

YUKON TERRITORY

The Comptroller of the Yukon in his report for the fiscal year ending March 31, 1936, states that there was considerable mining activity in the Mayo district during the latter half of the year. The Treadwell Yukon Company Ltd., again commenced mining on a large scale and were operating and opening up four properties, namely, the "Elsa", "Silver King", and the "Hector" groups on Galena Hill and the Reno Hill Ltd. group of claims on Keno Hill, which were taken last summer under lease. A new 250 ton mill was installed on the "Elsa" claim and is now operating to full capacity, ore being taken from the "Elsa" and also being hauled from the "Silver King" to supply mill feed. Rich shipping ore is being mined and sacked for shipment by this company from all three groups on Galena Hill and, to a lesser extent, from the development operations on Keno Hill.

The Treadwell Yukon Company, Ltd., has increased its holdings in the district and expects that its production in tons of concentrates from its present operations will be far greater than that from its former operations on Keno Hill in the old Wernecke camp.

Considerable individual prospecting and mining was also done in the district and high grade ore was mined and sacked from development conducted at the "No Cash", "Mastiff", "Carol" "Stone", "Twin Sisters", and "Lone Star" mineral claims.

For information relating to geology, mining laws, etc., in the territories, communicate with the Department of Mines and Resources, Ottawa.

Table 69.—Shipments of Lead Ores and Concentrates from Canadian Mines, 1926-1935

(For years 1913 to 1925, see 1928 report of the Mineral Production of Canada)

Year	Shipments		Lead content in pounds	Silver content in ounces
	Tons	Value \$		
1926.....	255,048	17,546,728	273,963,827	8,616,164
1927.....	275,328	13,044,514	308,903,620	8,831,840
1928.....	255,944	12,178,879	322,239,859	10,287,591
1929.....	258,203	15,990,117	328,877,236	10,177,926
1930.....	259,630	11,024,912	336,976,074	10,172,485
1931.....	193,370	5,673,421	253,963,266	8,502,392
1932.....	190,700	4,241,652	246,051,119	8,031,587
1933.....	200,686	5,756,420	266,522,718	7,405,322
1934.....	247,014	6,954,706	339,932,667	7,735,304
1935.....	254,189	9,762,416	332,087,683	7,846,840

Since 1932 figures include silver in silver-radium ore shipped from the Northwest Territories.

NOTE.—For complete metal contents of silver-lead-zinc ore shipments for 1934 and 1935, see Table 71.

Table 70.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry in Canada, 1934 and 1935

		†Yukon, Northwest Territories and Quebec	British Columbia	Canada
1934				
(*) Ore mined.....	tons	5,776	1,850,480	1,856,256
Ore milled.....	tons	2,742	1,836,622	1,839,364
Concentrates produced—Lead.....	tons	154	234,404	234,558
Zinc.....	tons	350	229,062	229,412
Others (data not available for publication).....				
1935				
(*) Ore mined.....	tons	114,977	2,019,772	2,134,749
Ore milled.....	tons	115,180	2,063,213	2,118,393
Concentrates produced—Lead.....	tons	2,414	236,477	238,891
Zinc.....	tons	8,766	222,190	230,956
Others (data not available for publication).....				

(*) Includes silver-pitchblende ores mined in the Northwest Territories.

†In 1935 a small amount of ore from Nova Scotia is included.

NOTE.—Concentrates produced in Quebec were not shipped in 1934.

Table 71.—Destination of Shipments from Silver-Lead-Zinc Mines of Canada†, 1934 and 1935

Products shipped	Tons shipped	Value at shipping point	Total metal content as determined by settlement assay:			
			Gold	Silver	Lead	Zinc
1934		\$	fine oz.	fine oz.	lb.	lb.
To Canadian smelters—						
Lead ore.....	9,479	435,969	529	982,292	3,746,086	1,173,828
Lead concentrates.....	222,921	6,029,344	158	6,015,793	315,207,427	16,316,514
Zinc concentrates (*).....	192,821	1,764,463	427,558	14,341,082	196,681,577	
Dry ore (a).....	471	75,437	215	109,964	17,839	
Total.....	425,692	8,305,213	902	7,535,607	333,312,434	214,171,919
To foreign smelters—						
Lead ore.....	2,225	175,348	111	494,284	1,818,569	6,348
Lead concentrates.....	11,918	238,608		132,971	19,142,746	
Zinc concentrates (*).....	22,223	165,912		2,715	71,293	26,901,816
Total.....	36,366	579,868	111	629,970	21,032,608	26,908,164
1935						
To Canadian smelters—						
Lead ore.....	11,597	518,957	1,279	782,229	3,777,338	968,513
Lead concentrates.....	225,939	8,662,762	5,718	6,352,259	316,672,349	16,271,062
Zinc concentrates (*).....	200,437	1,819,968		442,332	13,690,945	204,829,152
Dry ore (a).....	7,731	170,477	79	316,072	293,299	2,940
Total.....	445,704	11,172,164	7,076	7,892,892	334,433,931	222,071,667
To foreign smelters—						
Lead ore.....	154	22,086	7	40,109	138,594	
Lead concentrates.....	8,762	387,166	1,196	354,676	11,204,157	223,490
Zinc concentrates (*).....	20,379	176,524	511	97,546	220,218	20,823,340
Dry ore.....	16	968		1,495	1,946	
Total.....	29,301	586,744	1,714	493,826	11,564,915	21,046,830
Grand Total for 1935.....	475,005	11,758,908	8,790	8,386,718	345,998,846	243,118,497
(b) Less cost of fuel and process supplies.....		1,205,822				
Net Value.....		10,553,086				

NOTE.—In addition to the metal contained in shipments listed above, there are important quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia.

(*) Does not include zinc concentrates produced from copper-gold-zinc ores in Manitoba or British Columbia.

†Shipments from silver-lead-zinc mines were made entirely from mines in B.C. and Yukon in 1934 and from Quebec B.C. and Yukon in 1935. Shippers numbered 35 in 1934 and 61 in 1935.

(a) Includes shipments of silver ores and pitchblende from the Northwest Territories. Information relating to radium content of pitchblende is not available for publication.

(b) Deducted for the first time in 1935.

Table 72.—Capital Employed in the Silver-Lead-Zinc Mining Industry in Canada, 1934 and 1935

Province	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	\$	\$	\$	\$	\$	\$
1934						
Quebec, Yukon and N.W.T.*	3,116,211		182,582		385,629	3,684,422
British Columbia	8,137,237		845,032	4,976	252,160	9,239,405
Canada	11,253,448		1,027,614	4,976	637,789	12,923,827
1935						
Nova Scotia, Quebec, Yukon and N.W.T.*	664,246	1,679,134	241,139		413,891	2,998,410
British Columbia	4,387,637	7,921,022	867,305	51,229	371,338	13,598,531
Canada	5,051,883	9,600,156	1,108,444	51,229	785,229	16,596,941

* Includes data relating to silver and silver-pitchblende ores mined in the Northwest Territories.

† Excluding ore reserves.

Table 73.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1934 and 1935

Province	1934						1935					
	On salary	Mine		Mill	Total	Salaries and wages	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground					Surface	Under-ground			
						\$						\$
British Columbia...	107	246	504	298	1,155	1,685,395	148	340	600	289	1,377	2,140,035
Nova Scotia, Quebec, Yukon, and N.W.T.†	29	71	32	5	137	249,889	27	68	149	36	280	291,075
Canada	136	317	536	303	1,292	1,935,284	175	408	749	325	1,657	2,431,110

† Includes data on silver-radium mining operations in the Northwest Territories.

Table 74.—Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1933, 1934 and 1935

Month	1933	1934	1935
January	832	1,021	1,309
February	820	1,012	1,285
March	830	1,069	1,196
April	797	1,091	1,187
May	795	1,119	1,333
June	839	1,128	1,476
July	853	1,147	1,516
August	942	1,186	1,670
September	976	1,237	1,672
October	1,007	1,270	1,738
November	1,017	1,266	1,712
December	944	1,322	1,670

4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc**ARSENIC**

The commercial production of primary arsenic in Canada during 1935 totalled 2,558,789 pounds; this came entirely from the treatment of cobalt-silver-arsenic ores by the Deloro Smelting and Refining Company, Deloro, Ontario. The element was recovered and marketed by this company in the form of arsenious oxide or white arsenic. Auriferous quartz ores containing arsenic were exported for some years from a property located in British Columbia while shipments of a similar nature have also been recorded in Nova Scotia and Ontario.

The United States Bureau of Mines reports in the "Minerals Yearbook" that during 1935 sales of white arsenic in the United States were distributed approximately as follows:—insecticides, 70 per cent; weed killer, 16 per cent; glass industry, 6 per cent; wood preservative, 2 per cent, and exports, 6 per cent. That arsenic may gain in importance as a wood preservative is indicated by the appearance of an arsenic-copper combination developed recently in British India and patented in other countries. The product known as "Asai" is said to be suitable for injection into wood in steel-pressure cylinders (as it does not corrode steel, iron or brass) and to be as effective as creosote in its wood preserving properties. In Sweden the disposal of enormous stocks of arsenic, said to amount to 200,000 metric tons, is still a major problem. Annual production is probably 40,000 to 50,000 tons. An experimental laboratory has been established in Stockholm to work out new uses for arsenic in the control of plant diseases and in the impregnation of timber and concrete, and a larger refining plant has been built. Various concrete mixtures appear to offer the most promising means for disposing of large quantities of arsenic. The Boliden Mining Company has developed an "arsenic concrete" which is said to be especially suitable for protecting piles and other wooden structures exposed to the action of sea water. The Boliden Mining Company has also patented a new type of hydraulic cement with aluminium arsenate as the principal constituent; lime or lime-bearing substances and silica are also present. By hydration of the cement, the aluminium arsenate reacts with the lime, forming insoluble calcium arsenate which improves the resistance to disintegration of the hardened concrete. The aluminium arsenate also can be added to Portland cement or fused aluminate cement; it is produced by oxidation of arsenic trioxide mixed with bauxite or other material containing aluminium.

Table 75.—Production of Arsenic in Canada, 1926-1935

(For production from 1885-1925, see Annual Report Mineral Production, 1928)

Year	Arsenic in ore		White arsenic		Year	Arsenic in ore		White arsenic	
	tons	\$	tons	\$		tons	\$	tons	\$
1926.....	545	12,687	1,992	134,124	1931.....	.....	.....	1,787	135,170
1927.....	667	15,644	2,447	196,335	1932.....	.....	.....	1,212	98,714
1928.....	708	16,539	2,008	176,513	1933.....	.....	.....	734	56,534
1929.....	766	17,314	1,849	154,006	1934.....	*	.....	824	56,412
1930.....	1,011	34,523	1,250	95,004	1935.....	.....	.....	1,279	75,326

* A relatively small quantity of auriferous arsenical pyrites was exported from Nova Scotia in 1934; no payment was made for arsenic content.

Table 76.—Production (As_2O_3), Exports and Imports of Arsenic, for Canada, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
PRODUCTION—		\$		\$		\$
From arsenical concentrates exported.. lb.	.....	.....	*	.....	.....	.....
White arsenic and arsenic in other forms lb.	1,468,022	56,534	1,647,513	56,412	2,558,789	75,326
Total..... lb.	1,468,022	56,534	1,647,513	56,412	2,558,789	75,326
EXPORTS—						
Arsenic, As_2O_3 lb.	934,400	33,778	1,291,900	45,012	2,230,600	69,866
IMPORTS—						
White arsenic..... lb.	164,642	5,674	1,637,382	41,688	11,759	546
Sulphide of arsenic..... lb.	27,694	3,117	33,986	4,264	27,777	3,496
Arsenate of soda and stannate of..... lb.	390	101	638	211	2,128	666
Arsenate of lead..... lb.	498,673	44,256	450,748	37,788	324,328	26,388
Calcium arsenate..... lb.	287,420	17,426	165,077	9,123	144,023	7,786

* A small tonnage of auriferous arsenopyrite was exported from Nova Scotia in 1934; no settlement was made for the arsenic content.

Consumption of arsenic acid and arsenious acid in the manufacture of insecticides in Canada totalled 2,736,089 pounds valued at \$86,983 in 1935 as compared with 4,709,443 pounds worth \$168,185 in 1934.

Table 77.—World Production of Arsenic, 1933-1935

(Long tons)

Producing country and description	1933	1934	1935	Producing Country and description	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—CON.			
<i>United Kingdom—</i>				<i>Portugal—</i>			
White arsenic and arsenic				White arsenic.....	2	40	74
soot.....	121	185	172	<i>Roumania—</i>			
<i>Canada (Sales)</i>				Pyrites (As. content).....	61	12	29
White arsenic.....	655	736	1,142	<i>Sweden—</i>			
<i>Australia—</i>				Ore (As. content).....	37,839	28,166	24,032
White arsenic.....	1,776	2,230	2,840	White arsenic.....	847	7,288	6,250
FOREIGN COUNTRIES				<i>Mexico—</i>			
<i>Belgium (exports)—</i>				White arsenic.....	4,623	7,736	9,793
White arsenic.....	2,538	3,498	3,044	<i>United States—</i>			
<i>Czechoslovakia—</i>				White arsenic.....	9,509	11,693	12,712
Ore (As. content).....	55	44	68	<i>Brazil—</i>			
<i>France—</i>				White arsenic.....	317	689	681
Ore (As. content).....	5,792	6,899	(a)	<i>China—</i>			
White arsenic (As. content).....	8,473	8,463	(a)	Ore (b).....	1,141	1,187	1,200
<i>Germany—</i>				<i>Japan—</i>			
Ore (As. content).....	(a)	1,930	1,294	White arsenic.....	2,338	2,691	3,111
<i>Greece—</i>				<i>Korea—</i>			
White arsenic.....	331	147	164	White arsenic.....	150	327	367
Pyrites (As. content).....	443	305	300	<i>Turkey—</i>			
				Ore (As. content).....	20	13	27

NOTE.—White arsenic is also produced in Germany and U.S.S.R. (Russia).

(a) Information not available.

(b) Content varies from 20 to 60 per cent arsenic.

COBALT

Production of cobalt in Canada during 1935 totalled 681,419 pounds valued at \$512,705; the output of the metal came entirely from mines located in Northern Ontario.

For many years following the discovery in 1903 of cobalt-silver-arsenic ores in Ontario, the greater part of the world's supply of cobalt was derived from Canadian ores. During recent years Canada's production of the metal has decreased greatly as compared with the totals of earlier years. This resulted largely from depletion of ore reserves, also Canadian cobalt has encountered keen competition from the recently developed cobaltiferous ores of Central Africa.

There is at present only one smelter in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Limited, located at Deloro, Ontario. This company conducted continuous operations throughout 1935 producing cobalt metal, cobalt salts and cobalt oxide.

The annual report of the Union Minière du Haut-Katanga for 1935 states that the market for cobalt continued to expand and a satisfactory price arrangement was maintained between the principal producers of the metal. The latest figures available for the production of this company in the Belgian Congo were those for 1933 in which year 12,160 cwt. represented the cobalt content of metal, oxide and salts produced at Oolen (Belgium) from material shipped from the Belgian Congo.

The Rhodesia Chamber of Mines reported that 918,775 pounds of cobalt valued at £206,725 were produced in Northern Rhodesia during 1935 and the total output of the metal to December 31, 1935, amounted to 2,459,718 pounds worth £573,790. The British South African Company reports that during the financial year ended June 30, 1935, the Rhokana Corporation (Northern Rhodesia) sold 711,132 pounds of cobalt.

The "Minerals Yearbook" of the United States Bureau of Mines, 1936 edition, contains the following information relating to cobalt—"In the autumn of 1935 the cobalt syndicate, comprising leading Belgian, Canadian, Northern Rhodesian, and Moroccan producers, was strengthened by addition of the Association of German Cobalt Producers. The latter association, formed in October, 1934, is composed of 12 concerns, only 2 of which produce cobalt metal, the others being engaged in manufacturing cobalt oxides and salts. The former syndicate controlled about 80 per cent of the world output, and addition of the German producers has increased the percentage substantially. An important contribution to the technology of cobalt was made during the year at the Bureau of Mines, Experiment Station at Rolla, Mo., where flotation concentration of Nevada cobalt ores was worked out successfully. Late in the year the discovery of a 30 foot

vein of cobaltite containing 5 per cent cobalt was reported 18 miles northwest of Butte, Montana. After several years of experimenting, the Japan Cobalt Mining Co. succeeded in producing metallic cobalt and cobalt oxide on a commercial scale. Ore supplies are obtained from the Nagatomura cobalt-copper deposits, which are said to be ample to furnish about three tons monthly for thirty years. Encouraged by results obtained in exploiting the cobalt deposits in Narimanov, near Daschkessan, it was proposed early in 1935 to form a Transcaucasian cobalt combination for their further development".

The employment of cobalt in the manufacture of special alloys, including high speed cutting tools, continues to expand and its use in tanning has been recently suggested.

Table 78.—Production of Cobalt from Canadian Ores, 1926-1935

Year	Pounds	\$	Year	Pounds	\$
1926.....	664,778	1,136,014	1931.....	521,051	651,179
1927.....	880,590	1,764,554	1932.....	490,631	587,957
1928.....	956,590	1,672,320	1933.....	466,702	597,752
1929.....	929,415	1,801,915	1934.....	594,671	592,497
1930.....	694,163	1,144,007	1935.....	681,419	512,705

NOTE.—For years 1904 to 1925, see previous reports.

Table 79.—Production in Canada, and Exports of Cobalt, 1933-1935

	1933		1934		1935	
	Pounds	\$	Pounds	\$	Pounds	\$
PRODUCTION—						
Cobalt, computed as cobalt in metal, oxides and salts sold, and in ores and residues exported.....	466,702	597,752	594,671	592,497	681,419	512,705
EXPORTS—						
Cobalt alloys, cobalt metallics, cobalt oxides, cobalt salts and cobalt ores.....		552,450		614,364		541,554

Table 80.—World Production of Cobalt, 1933-1935

(Cwt.)

Producing country	1933	1934	1935
BRITISH EMPIRE			
Northern Rhodesia.....	2,330	11,429	8,203
Canada (c).....	4,167	5,310	6,084
India (b).....	2,300	3,477	4,452
Australia (metal).....	125	160	.....
FOREIGN COUNTRIES			
Belgian Congo (d).....	12,160	(a)	(a)
French Morocco.....	1,440	3,260	8,180
United States (e).....	11	.....	.....
Japan (ore).....	.....	.....	188

NOTE.—Complex ores containing Cobalt are also found in Germany, Greece and China, but figures of Cobalt content are not available.

(a) Information not available.

(b) Estimated Cobalt content of nickel-speiss exported to Hamburg.

(c) Metal recovered from smelter products plus Cobalt contained in Cobalt residues exported.

(d) Total Cobalt content of metal, oxide and salts produced at Oolen (Belgium) from materials shipped from the

Belgian Congo.

(e) Recovered at an electrolytic zinc plant.

Silver

By virtue of two Presidential Proclamations, the United States Government's buying price for newly mined domestic silver was raised to 77.57 cents an ounce on April 24, 1935. The proclamation, establishing that price, followed one made on April 10, that fixed the price at 71.11 cents. Necessity for the second proclamation, states the Engineering and Mining Journal, New York, developed when the world price of the metal advanced on April 24 to a level higher than that paid domestic producers. This last proclamation was the third made by President Roosevelt for the purpose of fixing the price of newly mined domestic silver, the first having been made on December 21, 1933; this earlier proclamation fixed the price of the metal at 64.64 cents an ounce.

The United States Bureau of Mines in a review of silver for 1935 states: "The open market price for silver was extremely erratic during the year. Sales of silver by oriental countries were reported to be heavy, and the policy of the United States Treasury in purchasing silver almost exclusively on the London Exchange was changed to one of buying in many different places. Considerable confusion resulted in the principal markets and silver prices declined precipitously."

In their 1935 review of the silver market "Handy and Harmon", New York, commented as follows: "In spite of the fact that we favour the principal of a market governed by the law of supply and demand, we appreciate that it would prove disastrous, under present conditions, to have the United States withdraw its support entirely. It is our hope, therefore, that the government in revising its policy will gradually relinquish its domination of the market with attendant purchases which such a position demands, and make every effort to create a world situation in which silver would again be absorbed for its various uses through the customary channels. A revision or repeal of the Silver Purchase Act may be necessary to accomplish this result. Time alone will tell whether our legislators at Washington will take such action; but if they do not, let us hope they will permit the Secretary of the Treasury to administer the present Act as its terms direct—for the 'public interest' and not for those 'silver interests' which are seeking \$1.29 per ounce".

E. Baliol Scott, in a "Review of Silver in 1935" (The Mining Journal, London) concludes as follows: "Silver has a value, but whether the current price fairly represents it in the opinion of sufficiently large number of the world's capitalists, great and small, is a point which can only be answered by experience. On that must turn the question whether the price of silver will remain stable or fall yet more heavily. Short of some further fantastic effort at valorisation we cannot see it holding out much more prospect of improvement".

CANADIAN GOVERNMENT ACTION REGARDING SILVER

On March 11, 1935, when the Bank of Canada commenced operations the silver then held by the Government was transferred to that institution, which assumed the liability of the Dominion notes outstanding. The silver transferred to the Bank of Canada and future purchases by it will form part of the reserve of the Bank of Canada (Section 26 (a), Bank of Canada Act). In 1935 the Bank of Canada purchased the required quota of silver, viz., 1,671,802 fine ounces. On August 31, 1936, the Bank of Canada reported in its monthly statement silver bullion held as \$1,822,462.74, valued at the current market price.

It is of interest to note that the Royal Canadian Mint, Ottawa, coined and issued the first Canadian silver dollars on April 17, 1935; the weight of this coin is 360 grains, 8/10 fine silver.

CANADIAN COMMODITY EXCHANGE

(Contributed by the Canadian Commodity Exchange, Inc., Montreal, Quebec.)

A total of 9,094 contracts, representing 90,940,000 ounces of silver 999 fine were sold on the Canadian Commodity Exchange, Inc., during 1935. May, July, September and December were the most heavily traded options with 1,406, 1,662, 2,410 and 1,843 contracts respectively. Turnover was highest during April and May.

The main development in the market for the metal was the heavy buying by the American Treasury in the spring of the year, when on two occasions the price paid by the American Treasury for newly-mined domestic silver was raised, on April 24th being fixed at 77.57 cents an ounce. The open market price as a result touched 81½ cents on the Canadian Commodity Exchange for delivery in the current month.

As no further advance in price was made the market grew quieter and prices declined gradually, the current option price at the end of November being 65.92 cents bid.

A crisis occurred in December when the U.S. Treasury withdrew its support from the London market, prices broke sharply and London for a time ceased to fix a forward price. The price for December delivery on Canadian Commodity Exchange dropped from a high of 66.03 cents to a low of 45.50 cents, and forward months were at a sharp discount. Prices steadied somewhat in the last days of the year and closed around 45 cents for current deliveries.

NEW USES

Commenting on a possible new market for silver "The Miner", Vancouver, states: "Among those industries which, it is expected, will benefit greatly through the introduction of television, is silver mining. Silver, as is well known, enters largely into the manufacture of photographic

film, and for some time at least television broadcasting will be mainly from film because of the prohibitive cost of installing the photographic equipment in studios which would be necessary if original subject matter were used. Thus the demand for film in this new field will be enormous. It is estimated that the quantity of film required for television reproduction will be twenty-six times that at present consumed in the motion picture industry. As at present ten million ounces of silver is consumed in the production of motion picture film in America, it will be realized what so great a demand for film would mean to the silver producer."

James A. Lee, American Institute of Chemical Engineers, describing metals and alloys used in the construction of chemical plants refers to silver as follows: "Silver has been used to a limited extent for chemical equipment for many years; but the recent changes which have taken place in the economic position of the metal, particularly their influence on its price, have broadened its use in the industry. It can be easily fabricated by spinning, drawing, or other operations, soldered either with soft solder or silver solder and joined by autogeneous gas welding.

"Silver equipment is generally made entirely of the one metal. Fine silver (999 fine) is preferred; sterling and coin silver are not so resistant although their strength is greater. Pure acetic acid stills and alkali fusion vessels are sometimes made entirely of silver . . . In the manufacture of certain tar products and in the recovery of solvents in the rayon industry, silver condensers are used. An American tannery employs silver and silver-lined vacuum pans. Silver equipment is used for processing foods more often in Europe than it is in America; jams, jellies and similar products are made in pure silver or silver-lined autoclaves, evaporating pans, vacuum stills and other equipment."

Table 81.—Production of Silver in Canada, by Provinces and by Sources, 1934 and 1935

(Contributed by the Canadian Commodity Exchange, Inc., Montreal, Quebec)

	1934		1935	
	Quantity	Value	Quantity	Value
	fine oz.	\$	fine oz.	\$
NOVA SCOTIA—				
In gold bullion—Total.....	321	152	372	241
QUEBEC—				
In gold ores, in blister copper, and in copper ores exported—Total....	470,254	223,187	668,836	433,338
ONTARIO—				
In silver bullion and nuggets.....	2,681,104	1,272,476	2,022,296	1,310,244
In gold bullion.....	418,528	198,637	441,982	286,360
In blister copper produced; and in ores, concentrates, residues and matte exported or treated in smelters outside the province.....	2,221,528	1,054,357	2,697,373	1,747,625
Total.....	5,321,160	2,525,470	5,161,651	3,344,229
MANITOBA—				
In gold bullion and in blister copper—Total.....	1,252,920	594,647	1,206,454	781,660
SASKATCHEWAN—				
In ores shipped to Canadian smelters—Total.....	87,551	41,552	201,608	130,622
ALBERTA—				
In alluvial gold—Total.....	35	17	16	10
BRITISH COLUMBIA—				
In alluvial gold.....	4,533	2,152	5,567	3,607
In gold bullion.....	44,707	21,218	44,992	29,150
In blister copper.....	344,425	163,467	282,050	182,740
In base bullion and in ores exported.....	8,336,056	3,956,367	8,845,791	5,731,180
Total.....	8,729,721	4,143,204	9,178,400	5,946,677
YUKON AND NORTHWEST TERRITORIES—				
In alluvial gold.....	8,708	4,133	8,034	5,205
In ores exported or shipped to Canadian smelters.....	544,612	258,478	193,187	125,166
Total.....	553,320	262,611	201,221	130,371
Canada.....	16,415,282	7,790,840	16,618,558	10,767,148

For 1935 fine silver was valued at 64.78991 cents per ounce, the average price for the metal on the New York market expressed in Canadian funds; for 1934 the corresponding price was 47.4609 cents.

Table 82.—Production of Silver in Canada for Years Specified, 1887-1935

Year	Ounces	\$	Cents per ounce	Year	Ounces	\$	Cents per ounce
1887.....	355,083	347,271	98-00	1925.....	20,228,988	13,971,150	69-06
1891.....	414,523	409,549	98-00	1926.....	22,371,924	13,894,531	62-11
1896.....	3,205,343	2,149,503	67-06	1927.....	22,736,698	12,816,677	56-37
1901.....	5,539,192	3,265,354	58-95	1928.....	21,936,407	12,761,725	58-18
1906.....	8,473,379	5,659,455	66-79	1929.....	23,143,261	12,264,308	52-99
1910*.....	32,869,264	17,580,455	53-49	1930.....	26,443,823	10,089,376	38-15
1911.....	32,559,044	17,355,272	53-30	1931.....	20,562,247	6,141,943	29-87
1916.....	25,459,741	16,717,121	65-66	1932.....	18,347,907	5,811,081	31-67
1919.....	16,020,657	17,802,474	(a) 111-122	1933.....	15,187,950	5,746,027	37-83
1920.....	13,330,357	13,450,330	100-90	1934.....	16,415,282	7,790,840	47-46
1924.....	19,736,323	13,180,113	66-78	1935.....	16,618,558	10,767,148	64-79

*Year of maximum output.

(a) Highest price per ounce recorded since 1887.

From 1887 to 1935, inclusive, the silver production of Canada amounted to 696,969,927 fine ounces valued at \$417,065,960. For a complete record of annual production see previous reports.

Table 83.—Production of Silver, by Principal Silver-producing Provinces, 1926-1935

(For the years 1887 to 1925 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		Manitoba		British Columbia		Yukon Territory	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
		\$		\$		\$		\$		\$
1925.....	214,943	148,451	10,529,131	7,271,944	477	329	8,579,458	5,925,403	904,893	624,964
1926.....	375,986	233,513	9,274,965	5,760,402	18	11	10,625,816	6,599,376	2,095,027	1,301,159
1927.....	740,864	417,625	9,307,953	5,246,893	12	7	11,040,445	6,223,499	1,647,295	928,580
1928.....	908,959	528,796	7,242,601	4,213,456	1,763	1,026	10,943,367	6,366,413	2,839,633	1,651,985
1929.....	813,821	431,268	8,890,726	4,711,462	2,644	1,401	10,156,408	5,382,185	3,279,530	1,737,922
1930.....	571,164	217,922	10,205,683	3,893,876	94,653	36,114	11,825,930	4,512,065	3,746,326	1,429,373
1931.....	530,345	158,414	7,438,951	2,222,014	836,547	249,877	8,061,599	2,408,000	3,694,728	1,103,615
1932†.....	628,902	199,184	6,335,788	2,006,648	1,036,497	328,275	7,293,462	2,309,958	3,053,188	966,994
1933.....	471,419	178,351	4,535,680	1,715,975	1,101,578	416,758	6,737,057	2,548,817	2,227,476	842,717
1934.....	470,254	223,187	5,321,160	2,525,470	1,252,920	594,647	8,729,721	4,143,204	553,320	262,611
1935.....	668,836	433,338	5,161,651	3,344,229	1,206,454	781,660	9,178,400	5,946,677	201,221	130,371

†Northwest Territories production included with Yukon since 1932.

For data relating to silver in mine shipments from Cobalt District and nearby camps in Ontario, see previous reports. In 1935 Saskatchewan was credited with 201,608 fine ounces valued at \$130,622, representing the estimated metal recovered from that part of the Flin Flon mine situated in Saskatchewan.

Table 84.—Source of Canadian Silver Production, by Percentages 1933-1935

	1933	1934	1935
In silver-cobalt ores.....	20-4	18-7	15-0
*In base bullion.....	34-6	45-1	47-9
In gold ores (bullion and placer).....	3-0	7-2	7-4
In blister copper.....	19-5	23-4	26-1
In matte, copper ores and silver-lead ores exported, etc.....	22-5	5-6	3-6
	100-0	100-0	100-0

*Chiefly from silver-lead ores.

36433-64

Table 85.—Comparative Copper, Silver and Lead Production in Canada for Years Specified

Year	Total copper production, Canada	(*) Silver, Ontario	Total lead production, Canada	Total silver production, Canada
	Pounds	Fine oz.	Pounds	Fine oz.
1907.....	56,979,205	10,023,311	47,738,703	12,779,799
1911.....	55,648,011	(†) 31,507,791	23,784,969	32,559,044
1915.....	100,785,150	24,746,534	46,316,450	26,625,960
1919.....	75,053,581	11,214,317	43,827,699	16,020,657
1923.....	86,881,537	10,377,846	111,234,466	18,601,744
1924.....	104,457,447	9,935,902	175,485,499	19,736,323
1925.....	111,450,518	10,707,235	253,590,578	20,228,988
1926.....	133,094,942	10,543,473	233,801,265	22,371,924
1927.....	140,147,440	8,543,513	311,423,161	22,736,698
1928.....	202,696,046	6,745,401	337,946,688	21,936,400
1929.....	248,120,760	7,781,429	326,522,566	23,143,261
1930.....	303,478,356	9,225,610	332,894,163	26,443,823
1931.....	292,304,390	5,998,482	267,342,482	20,562,247
1932.....	247,679,070	4,659,304	255,947,378	18,347,907
1933.....	299,982,448	3,641,930	266,475,191	15,187,950
1934.....	364,761,062	3,029,638	346,275,576	16,415,282
1935.....	418,997,700	(a) 2,466,157	339,105,079	16,618,558

(*) Shipments from silver-cobalt camps as recorded by Ontario Department of Mines—Total output from these fields 427,075,482 ounces—1904-1935 inclusive.

(†) Year of maximum production.

(a) Subject to revision.

Table 86.—Average Commercial Ratio of Silver to Gold for Each Specified Year Since 1700

(Supplied by *United States Mint*)

Year	—	Year	—	Year	—
1700.....	14-81	1890.....	19-75	1925.....	29-78
1750.....	14-55	1895.....	31-60	1930.....	53-74
1800.....	15-68	1900.....	33-33	1931.....	71-25
1850.....	15-70	1905.....	33-87	1932.....	73-29
1875.....	16-64	1910.....	38-22	1933.....	59-06
1880.....	18-05	1915.....	40-48	1934†.....	72-49
1885.....	19-41	1920.....	20-28	1935†.....	54-31

†Estimated on averages in Canadian funds.

Table 87.—Silver Consumed in Specified Canadian Industries, 1934-1935

Industry	1934		1935	
	Fine oz.	Value	Fine oz.	Value
Scientific equipment..... (a)	753,379	\$ 357,838	614,378	\$ 361,775
Fountain pens and pencils)				
Jewellery and silverware—				
Jewellery.....		41,917		48,072
Refiners (b).....		12,081		20,822
Silverware.....		248,827		294,833
Medicinal and pharmaceutical preparations.....	53,156	23,185	36,260	21,735
Miscellaneous chemicals.....	19,144	9,502	17,424	7,841

(a) Consumed largely in the manufacture of photographic film.

(b) Probably duplicated in some of the figures shown for other industries.

Table 88.—Imports into Canada and Exports of Silver, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
	Fine oz.	\$	Fine oz.	\$
IMPORTS—				
Silver in bars, etc., unmanufactured		2,193,201		5,584,906
Silver, manufactures of, n.o.p., and articles consisting wholly or in part of sterling or other silverware		67,425		64,596
Silver and other coin except gold				
Total		2,260,626		5,649,502
EXPORTS—				
Silver contained in ore, concentrates, etc.	1,745,152	714,444	1,364,008	882,106
(a) Silver bullion	10,664,182	4,933,690	16,963,181	10,953,083
Total	12,409,334	5,648,134	18,327,189	11,835,189
Silver coin, Foreign		615,665		896,010
Silver coin, Canadian		30,250		38,198

(a) In addition there were exported from Canada during 1935—7,098,435 ounces of foreign silver bullion valued at \$4,501,088.

Table 89.—Monthly Average Prices of Silver, 1933-1935

(From the *Engineering and Mining Journal*)

Month	New York (Cents per fine ounce) ·999 fine			London Spot (Pence per standard ounce) ·925 fine		
	1933	1934	1935	1933	1934	1935
January	25·400	44·188	54·418	16·883	19·382	24·584
February	26·074	45·233	54·602	16·885	20·073	24·818
March	27·928	45·875	59·048	17·588	20·278	27·380
April	30·730	45·180	67·788	18·440	19·740	30·986
May	34·072	44·226	74·356	19·046	19·276	33·865
June	35·663	45·173	71·940	19·078	19·981	32·346
July	37·630	46·310	68·216	18·341	20·512	30·500
August	36·074	48·986	66·366	17·877	21·377	29·476
September	38·440	49·484	65·375	18·272	21·888	29·255
October	38·190	52·375	65·375	18·221	23·581	29·368
November	41·974	54·255	65·375	18·428	24·257	29·284
December	43·550	54·390	58·420	18·674	24·404	25·563
Average	34·727	47·973	64·273	18·144	21·229	28·952

The average price of silver in Canadian funds based on the New York market in 1933, was 37·8328 cents per fine ounce, in 1934, it was 47·4609 cents, and in 1935 it was 64·7899 cents.

Table 90.—Comparative Figures of Silver Production, for the World, Mexico, the United States, Peru, and Canada, 1926-1935

Year	World's Output*	Mexico's Output*	United States Output*	Peru's Output*	Canada's Output
	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1926	253,795,166	98,291,166	62,672,953	21,499,798	22,371,924
1927	251,096,555	104,573,919	60,394,199	18,295,408	22,736,698
1928	257,925,154	108,537,307	58,426,004	21,607,693	21,936,407
1929	260,970,029	108,871,442	61,233,321	21,495,169	23,143,261
1930†	247,000,000	105,204,059	47,724,903	14,372,593	26,443,823
1931	197,000,000	86,064,457	29,856,628	8,794,407	20,562,247
1932 (a)	165,000,000	69,303,119	22,739,681	3,518,783	18,347,907
1933 (a)	170,000,000	68,101,062	23,128,783	7,595,180	15,187,950
1934 (a)	191,000,000	74,143,301	32,514,118	11,338,212	16,415,282
1935	222,000,000	75,587,447	48,511,487	17,103,768	16,618,558

*Prior to 1930 from Annual report of the "Director of the Mint," Washington.

†Beginning with 1930, figures from the Imperial Institute.

(a) Excluding the production of U.S.S.R. (Russia), figures for which are not available.

NOTE.—For years 1898 to 1925, see previous reports.

Table 91.—World Production of Silver Ore, 1933-1935

(In terms of metal)
(Supplied by Imperial Institute)
(Fine ounces)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES concluded			
United Kingdom.....	37,553	138,974	92,848	Spain.....	2,929,508	1,788,247	(a)
Bechuanaland Protectorate.....	622	957	1,759	Sweden.....	928,203	754,496	835,771
Gold Coast (estimated).....	10,000	11,000	12,000	U.S.S.R. (estimated).....	2,500,000	2,900,000	3,900,000
Kenya.....	1,613	1,969	3,743	Yugoslavia.....	2,055,000	2,073,000	2,060,000
Nigeria.....	117,480	81,000	139,200	Algeria.....	27,300	37,000	(a)
Northern Rhodesia.....	25	187	151	Belgian Congo.....	2,646,523	3,399,541	3,800,000
Sierra Leone.....	864	1,400	1,673	Morocco (Spanish zone).....	6,870	(a)	(a)
Southern Rhodesia.....	112,434	128,381	132,087	Morocco (French zone).....	(a)	(a)	900
Tanganyika Territory.....	3,891	4,876	6,134	Mozambique.....	224	763	725
Uganda.....	(a)	383	346	Tunis.....	2,896	22,022	(a)
Union of South Africa.....	1,065,011	1,002,203	1,042,203	Mexico.....	68,101,062	74,143,301	75,587,447
Canada.....	15,187,950	16,415,282	16,618,558	Porto Rico.....		11	8
Newfoundland.....	1,208,280	1,103,091	1,123,997	United States.....	23,128,783	32,782,304	48,511,487
British Guiana (estimated).....	3,070	3,340	4,010	Guatemala (c).....	26	19,068	(a)
Cyprus.....			(d) 44,536	Honduras.....	3,911,686	3,091,522	2,641,346
India.....	6,080,241	5,817,524	5,850,406	Nicaragua.....	20,859	45,241	88,543
Federated Malay States (estimated).....	2,600	2,700	2,600	Panama.....	462	11,294	3,370
Australia.....	10,817,162	11,357,091	11,562,373	Salvador.....	(c) 174	4,848	2,983
Fiji.....	(a)	(a)	634	Argentina (b).....	50,000	60,000	(a)
New Zealand.....	430,492	382,615	437,967	Bolivia (exports).....	5,469,069	5,216,177	7,951,338
Total.....	35,000,000	36,000,000	37,000,000	Brazil.....	23,393	22,275	20,833
FOREIGN COUNTRIES				Chile.....	257,128	1,051,115	1,298,764
Austria.....	39,062	28,189	18,318	Colombia.....	108,005	127,461	132,965
Bulgaria.....	16,718	16,493	18,454	Ecuador.....	107,562	96,354	80,266
Czechoslovakia.....	980,716	982,422	1,028,645	Guiana (French and Dutch (estimated).....	6,000	6,000	6,000
France.....	300,602	300,506	569,605	Peru.....	7,460,504	10,366,607	17,103,768
Germany.....	6,320,700	5,944,021	6,256,400	Venezuela (b).....	6,000	7,000	(a)
Greece.....	593,730	525,791	217,906	China.....	243,645	147,594	(a)
Hungary.....	19,186	13,668	13,263	Formosa.....	170,000	(a)	(a)
Italy.....	342,639	365,600	420,000	French Indo-China.....		3,600	3,632
Norway.....	252,493	200,096	266,080	Japan.....	5,967,370	6,984,729	8,230,555
Poland.....	41,377	21,090	(a)	Korea.....	750,000	1,050,000	1,265,000
Roumania.....	353,489	417,661	475,223	Netherlands East Indies.....	860,462	773,999	701,700
				Philippine Islands.....	170,042	212,700	314,054
				Total.....	137,000,000	156,000,000	185,000,000
				World's Total.....	172,000,000	192,000,000	222,000,000

(a) Information not available.

(b) Estimates of the United States Mint.

(c) Imported into the United States from the country indicated.

(d) Exports.

Table 92.—World Silver Consumption, Production and Other Supplies*, 1934 and 1935

(In millions of fine ounces)

Consumption	1934	1935	Production and Supplies	1934	1935
U.S. Government Acquisitions:—			Production:—		
Domestic production.....	21.4	37.9	United States.....	26.4	38.4
Nationalized stocks.....	111.2	2.0	Mexico.....	74.1	72.2
Open market purchases.....	174.5	503.9	Canada.....	16.4	16.4
	307.1	543.8	South America.....	16.0	25.0
Other Government Purchases under the Eight Nation Silver Pact:—			All other countries.....	52.5	54.5
Mexico.....	7.2	7.2	Total production.....	185.4	206.5
Canada.....	1.7	1.7	Other Supplies:—		
Peru.....	1.1	1.1	Sales by China, including smuggled silver not reported.....	200.0	190.0
Australia.....	0.6	0.6	Sales by Indian Government.....	33.0	35.0
Coinage:—			Sales by Soviet Government.....	25.0	19.0
Cuba.....	7.8	15.5	Other Demonetization:—		
Colombia.....	3.6	1.8	Peru.....		0.5
Venezuela.....			Austria.....		2.0
Hong Kong.....	9.0	0.3	Persia.....		3.4
Others.....	0.6	5.0	Indo-China.....		3.5
Indian consumption.....	15.0	12.0	Netherland India.....		2.0
German consumption.....	12.4		Unallocated supplies.....		160.6
Arts and Industries—					
In United States and Canada.....	25.0	23.5			
In England.....	13.0	10.0			
Unallocated demand probably representing increased speculative holdings.....	39.3				
Total.....	443.4	622.5		443.4	622.5

(*As estimated and supplied by Handy and Harman, New York.

Table 93.—World's Monetary Stocks of Silver at the Close of 1934 (c)

(Supplied by United States Mint and subject to revision)
(stated in United States money, 000's omitted)

Country	Silver stocks in banks and treasuries (a)	Per capita	
		1934	1933
	\$	\$	\$
United States.....	1,064,593	8.45	6.73
Canada.....	47,215	4.39	2.71
Mexico.....	98,748	5.61	3.66
Chile.....	4,532 (1) (4)	1.02	0.73
Columbia.....	22,133 (1)	2.45	1.27
Peru.....	9,929 (1)	1.48	0.81
Venezuela.....	26,679 (1) (4)	8.08	5.02
Austria.....	12,464 (1)	1.85	1.49
Belgium.....	20,458 (4)	2.48	1.16
France.....	38,666 (9)	0.92	2.62
Germany.....	538,785 (1)	8.24	4.98
Great Britain.....	432,168 (1)	9.27	5.64
Greece.....	2,847 (1)	0.43	0.39
Irish Free State.....	10,793 (1) (5)	3.60	2.05
Italy.....			2.06
Latvia.....	14,045 (1)	7.24	4.32
Netherlands.....	94,845 (1)	11.44	1.29
Norway.....	3,176 (1)	1.11	0.67
Poland.....	59,256 (1)	1.79	0.98
Rumania.....	2,388	0.13	0.05
Russia (Soviet Union).....	8,007 (3) (6) (7)	0.05	0.02
Spain.....	221,225	9.13	5.27
Switzerland.....	1,633	0.39	9.15
Yugoslavia.....	29,800 (1)	2.05	1.26
Ceylon.....	16,764 (1)	3.07	1.87
China.....	802,340 (2) (8)	1.78	1.45
India—British.....	1,951,141 (1)	5.37	3.90
Iraq (Mesopotamia).....			7.60
Japan (including Chosen, Taiwan, Kwantung).....	407,573 (1)	4.23	0.44
Netherlands East Indies.....	93,135 (1)	1.47	0.22
Philippine Islands.....	18,886 (1)	1.47	1.51
Siam.....	41,865	3.30	2.05
Straits Settlements.....			19.18
Egypt.....	38,041 (1)	2.50	1.45
Ethiopia.....	21,784 (1) (2)	3.11	1.13
Kenya, Uganda and Tanganyika.....	22,248 (1)	1.89	1.82
Sudan—Anglo Egyptian.....	14,801 (1)	2.58	1.56
Union of South Africa.....	22,093 (1)	2.62	1.46
Australia.....			5.47
Tanganyika.....	(see above)		1.81
Others.....	207,503		
Total.....	6,422,559	3.19	2.20

NOTE.—The amount of silver in circulation in many countries is not obtainable, and in some countries that held by private banks cannot be given.

(1) Estimated silver circulation included.

(2) Valued at \$0.48283 per fine ounce of silver.

(3) Prior years figures at new valuation.

(4) Includes base metal coin.

(5) British currency still circulates in Irish Free State.

(6) On January 1, 1935.

(7) Includes platinum.

(8) Incomplete.

(9) On December 26, 1934.

(a) At par equivalent of stated value.

(b) Not including Tanganyika.

(c) Compiled from such data as are available.

NOTE.—Number footnotes refer to 1934 only.

Table 94.—Silver Content of Principal World Coins

Coin	Country	Fine silver content— grains
Pesa (old).....	Mexico.....	185-188
Dollar.....	United States.....	371-250
Dollar.....	Canada.....	288-000
Shilling (new).....	Great Britain.....	43-636
5 Lira (new).....	Italy.....	64-430
2 Zloty (new).....	Poland.....	50-927
Schilling (new).....	Austria.....	59-260
10 Franc (new).....	France.....	104-940
Mark (a).....	Germany.....	38-551
Rouble (new).....	Russia.....	277-782
Ruppee.....	India.....	165-000
Yuan.....	China.....	362-559
Peseta (old).....	Spain.....	64-430

(a) Legislation in 1933 provided for the replacement of the one-mark silver coins by nickel coins, and the mintage of new silver coins in denominations of two-and five-marks, with correspondingly proportionate silver content.

Lead

The Consolidated Mining and Smelting Company of Canada, Limited, reported that "during the early part of the year an accord was reached by the Empire producers of lead and zinc with the British fabricators of these metals, resulting in the substitution of small but specific duties for the ad valorem ones provided in the Ottawa agreements, and in the elimination of the obligation to supply British fabricators at world prices, and resulting too, in what was much more important, the establishment of friendly and mutually helpful relations between Empire producers and British fabricators. World lead production and consumption in 1935 was in better volume than for the preceding four years. The improvement in demand and price continued without any pronounced setback until the high for the year of £19/15/0 was registered on the 7th of October. This was the peak price since February, 1930".

The United States Bureau of Mines in a review of lead for 1935 states: "World smelter production of lead increased 6 per cent in 1935 and was equivalent to 78 per cent of the record output in 1929. Production increased 5 per cent over 1934 in the United States and 7 per cent elsewhere. The United States output amounted to only 46 per cent of the 1929 total, whereas that of the rest of the world was 96 per cent. The United States continued as the leading producer and contributed 21 per cent of the 1935 total.

"World consumption of lead in 1935 was estimated at 1,426,700 metric tons, an increase of 6 per cent over 1934. The increase in the United States, after allowance for changes in stocks and including secondary and antimonial lead produced at primary refineries, was 17 per cent compared with 3 per cent elsewhere. In Europe there was a marked decline in the use of lead in Belgium and France, while Germany, Italy and the U.S.S.R. (Russia) recorded large increases. Consumption in the United Kingdom declined only slightly from the record of 1934. Japan also took less lead in 1935 than in 1934. The United States used 25 per cent of the total amount consumed in 1935 and again ranked first in lead consumption after having yielded its premier position to the United Kingdom in 1934. The leading consumers, besides the United States, and the percentage of the total each absorbed in 1935 were as follows: United Kingdom, 23; Germany, 12; Japan, 7; France, 6; U.S.S.R. (Russia), 5; Italy, 4; and Belgium, 3".

Table 95.—Production of Lead from Canadian Ores, 1926-1935

Year	Pounds	Value	Price per pound in cents*	Year	Pounds	Value	Price per pound in cents*
		\$				\$	
1926.....	263,801,265	19,240,661	6-751	1931.....	267,342,482	7,260,183	2-710
1927.....	311,423,161	16,477,139	5-256	1932.....	255,947,378	5,409,704	2-114
1928.....	337,946,688	15,553,231	4-576	1933.....	266,475,191	6,372,998	2-392
1929.....	326,522,566	16,544,248	5-054	1934 (a).....	346,276,576	8,436,658	2-436
1930.....	352,894,163	13,102,635	3-927	1935.....	339,105,079	10,624,772	3-133

The data given represent the quantity of lead produced in Canada from domestic ores, together with the estimated lead recovery from lead ores and concentrates exported.

NOTE.—For years 1887 to 1925, see previous reports.

*In Canadian funds.

(a) Year of maximum output of Canadian lead.

Production of lead from Canadian ores from 1887 to 1935, inclusive, totals 4,771,442,194 pounds valued at \$227,134,681.

Table 96.—Production of Lead from Canadian Ores, by Provinces, 1926-1935

(For years 1887 to 1925 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		British Columbia		Yukon and Northwest Territories	
	Pounds	Value \$	Pounds	Value \$	Pounds	Value \$	Pounds	Value \$
1926.....	3,729,636	251,788	7,398,795	580,730	266,812,461	18,012,509	5,860,373	395,634
1927.....	6,496,577	341,461	7,990,709	525,729	292,770,544	15,388,020	4,165,331	218,929
1928.....	6,218,336	284,520	6,814,757	402,289	317,722,146	14,537,377	7,191,449	329,045
1929.....	5,358,804	270,616	4,769,506	294,431	307,999,153	15,555,189	8,395,603	424,012
1930.....			2,193,856	116,034	321,803,725	12,637,232	8,896,582	349,369
1931.....			985,633	41,647	261,902,236	7,097,812	4,454,613	120,724
1932.....			86,477	1,828	252,007,574	5,326,432	3,853,327	81,444
1933.....			29,910	692	263,345,776	6,298,178	3,099,505	74,128
1934.....			21,558	525	344,467,138	8,392,597	1,786,880	43,536
1935.....	2,047,624	64,156	22,532	706	336,784,326	10,552,059	231,418	7,250

In addition there were 19,179 pounds valued at \$601 produced in Manitoba in 1935.

Table 97.—Refined Lead Production in Canada,* 1926-1935

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1926.....	257,273,585	1931.....	278,448,457
1927.....	295,766,327	1932.....	253,136,522
1928.....	301,067,819	1933.....	254,565,861
1929.....	304,449,673	1934.....	†314,457,735
1930.....	304,471,706	1935.....	†327,515,277

*Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C.; and also the pig lead from Galetta, Ont., until 1931. †Primary lead only.

Table 98.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1934 and 1935

Industries	Items Used	1934 Pounds	1935 Pounds
Brass and copper products.....	Pig lead.....	631,928	534,606
	Scrap and other lead.....	119,275	162,421
Paints and pigments.....	Pig lead.....	12,569,302	15,183,865
White metal alloys.....	Pig lead, etc.....	8,759,089	8,209,962
	Scrap lead.....	9,760,366	11,924,180
Electrical apparatus.....	Pig lead.....	13,211,023	17,329,633
	Scrap lead.....	166,684	106,732
Iron and steel.....	Lead sheets, etc.....	556,427	786,558
	Lead.....	915,285	1,096,432
Grand Total—Metal.....		46,689,379	55,334,389
	Red lead.....	561,358	632,816
	Litharge.....	923,612	1,291,625
Paints and Pigments.....	Basic carbonate white lead dry.....	2,595,179	2,709,809
	Basic carbonate white lead—in oil.....	1,216,995	1,300,585
Electrical apparatus.....	Basic sulphate white lead—sublimed.....	11,069	92,442
	Lead oxides.....	4,899,031	3,781,853

Table 99.—Imports into Canada and Exports of Lead, 1934 and 1935

	1934		1935	
	Pounds	Value \$	Pounds	Value \$
IMPORTS—				
Old and scrap, pig and block.....	102,294	3,921	108,863	5,472
Bars and sheets.....	59,877	2,500	69,794	2,959
Litharge.....	1,689,100	91,975	1,750,400	100,689
Acetate of lead (not ground).....	151,635	11,860	216,600	16,504
Nitrate of lead (not ground).....	243,110	12,504	201,160	11,447
Other manufactures.....		78,475		70,988
Pipe lead.....	7,254	336	4,022	301
Shots and bullets.....	14,187	939	9,824	696
Tea lead.....			3,410	252
Lead arsenate.....	450,748	37,788	324,328	26,388
Lead tetraethyl, compounds of.....	1,821,083	1,053,503	2,381,734	1,249,477
Lead capsules for bottles.....		34,724		44,965
Lead pigments—				
Dry white lead.....	152,409	9,827	16,196	1,089
White lead, ground in oil.....	16,258	1,706	16,788	1,424
Dry red lead and orange mineral.....	551,597	33,077	595,584	35,392
Total.....		1,373,135		1,568,043
EXPORTS				
Lead, contained in ore, etc.—				
To United Kingdom.....			2,900	104
United States.....	1,918,300	76,726	114,300	4,570
Belgium.....	21,726,500	432,780	11,182,300	285,081
Total lead in ore.....	23,644,800	509,506	11,299,500	289,755
Pig lead, refined lead, etc.—				
To United Kingdom.....	162,055,700	2,963,356	187,815,800	4,482,586
United States.....			1,800	98
Japan.....	90,887,500	1,706,885	69,257,200	1,751,691
Netherlands.....	2,195,200	44,120	672,100	23,099
China.....	9,963,200	181,222	6,689,900	157,764
Brazil.....	6,184,000	114,712	3,456,900	95,766
Germany.....	1,797,200	35,155	10,800	350
Other countries.....	10,076,200	192,753	15,009,000	360,115
Total pig lead.....	283,159,000	5,238,203	282,913,500	6,871,469
Total Lead Exports.....	306,803,800	5,747,709	294,213,000	7,161,224

Table 100.—Monthly Average Prices of Pig Lead, Montreal,* New York and London,† 1933-1935

Month	Montreal (Value in cents per pound)			New York (Value in cents per pound)			London† (Value in pounds sterling per long ton)		
	1933	1934	1935	1933	1934	1935	1933	1934	1935
January.....	3.262	3.924	3.25	3.000	4.000	3.692	10.458	11.304	10.321
February.....	3.400	3.983	3.25	3.000	4.000	3.528	10.431	11.634	10.216
March.....	3.459	4.152	3.32	3.146	4.000	3.579	10.609	11.545	11.012
April.....	3.416	4.139	3.43	3.260	4.179	3.692	10.872	11.500	12.231
May.....	3.636	4.294	3.69	3.654	4.140	3.962	12.095	11.051	13.861
June.....	3.933	4.637	3.71	4.173	3.975	4.020	13.280	11.054	13.776
July.....	4.174	5.095	3.88	4.452	3.772	4.123	13.411	10.813	14.451
August.....	3.889	4.809	4.16	4.500	3.747	4.254	12.182	10.821	15.774
September.....	3.848	4.802	4.30	4.500	3.685	4.413	11.932	10.388	16.262
October.....	3.688	4.657	4.72	4.313	3.654	4.512	11.804	10.359	18.209
November.....	3.848	4.643	4.74	4.288	3.567	4.500	11.537	10.432	17.938
December.....	3.903	4.720	4.66	4.141	3.604	4.500	11.431	10.316	16.803
Average.....	3.705	4.488	3.93	3.869	3.860	4.065	11.670	10.935	14.238

*Producers' prices for car load quantities ex-cars Montreal, as furnished by the Consolidated Mining and Smelting Company.

†From the Engineering and Mining Journal.

‡The average price of lead for 1933, based on daily quotations in London and transposed to Canadian funds, was 2.3916 cents per pound, the average price of lead, based on the same market, was 2.4364 cents per pound for 1934 and 3.13318 cents for 1935.

Table 101.—World Production of Lead Ore, 1933-1935

(Supplied by Imperial Institute)

(In terms of metal)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	39,735	53,816	41,230	Concluded			
Nigeria.....	636	440	690	Roumania.....	3,131	2,729	3,068
Northern Rhodesia.....	(a)	(a)	5,867	Spain (smelter).....	82,175	71,011	61,751
Union of South Africa.....	86	71	5	Sweden.....	7,401	8,118	8,727
Canada (b).....	118,962	154,588	151,386	U.S.S.R. (Russia)			
Newfoundland.....	34,374	37,227	35,010	(smelter).....	13,455	26,722	36,000
Federated Malay States.....			23	Yugoslavia.....	60,146	69,062	67,000
India.....	96,100	88,800	89,400	Algeria.....	384	630	851
Australia.....	221,889	229,825	221,793	Morocco (French).....	20	192	152
				Morocco (Spanish).....	609	(a)	(a)
Total.....	510,000	570,000	550,000	Tunis.....	3,700	5,100	5,000
				Guatemala (estimated).....	30	30	40
FOREIGN COUNTRIES				Mexico (b).....	116,818	163,706	181,284
Austria.....	6,209	5,183	5,498	United States (b).....	243,462	256,636	296,179
Bulgaria.....	461	452	505	Argentina.....	4,228	2,798	2,494
Czechoslovakia.....	3,830	3,428	3,786	Bolivia (exports).....	7,721	11,023	9,588
Finland.....	333	246	337	Brazil (estimated).....	150	(a)	(a)
France.....	871	876	3,287	Chile.....	32	109	101
Germany.....	52,813	57,995	59,701	Peru.....	1,918	8,959	28,094
Greece.....	13,200	14,900	6,000	China.....	3,100	3,900	(a)
Hungary.....	10	(a)	(a)	French Indo-China.....		7	
Italy.....	17,625	18,800	21,600	Japan (smelter).....	6,717	6,928	7,325
Norway.....	806	492	325	Korea (smelter).....	771	1,777	1,701
Poland.....	5,000	6,000	6,500	Turkey.....	2,091	4,931	2,600
Portugal.....	209	3					
				Total.....	660,000	750,000	810,000
				World's Total.....	1,170,000	1,320,000	1,360,000

(a) Information not available.

(b) Amount estimated as recoverable.

Table 102.—World Metal Production of Lead, 1933-1935

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES Concluded			
United Kingdom.....	5,500	9,000	22,000	Poland.....	11,845	10,187	18,522
Northern Rhodesia.....	73	184	182	Portugal.....	68	53	.....
South West Africa (d)....	402	.....	.....	Roumania.....	4,018	4,238	4,485
Canada.....	113,645	140,383	146,212	Spain.....	86,959	71,011	61,751
India.....	72,045	71,815	72,060	U.S.S.R. (Russia).....	13,455	26,722	36,000
Australia (e).....	205,264	196,005	217,934	Yugoslavia.....	6,219	9,649	7,822
Total.....	397,000	417,000	458,000	Tunis.....	14,638	26,880	24,989
FOREIGN COUNTRIES				Mexico.....	117,700	168,000	170,886
Austria.....	4,552	5,540	7,921	United States.....	238,654	276,859	289,432
Belgium (b).....	68,294	73,569	67,891	Argentina.....	9,483	4,967	4,038
Czechoslovakia.....	3,751	4,002	4,729	Peru.....	394	1,959	7,560
France.....	20,105	30,651	5,500	China.....	3,783	1,639	.....
Germany (c).....	130,000	122,022	126,247	French Indo-China.....	18	15	18
Greece.....	8,075	8,758	5,168	Japan.....	6,717	6,928	7,325
Hungary.....	10	41	13	Korea.....	771	1,777	1,701
Italy.....	24,365	47,087	41,879	Total.....	770,000	900,000	900,000
Norway.....	359	328	568	World's Total.....	1,170,000	1,320,000	1,360,000

(b) Includes base bullion as follows:—

1933.....	7,687 long tons
1934.....	7,972 " "
1935.....	1,978 " "

(c) Includes some secondary. Figures as published by metallgesellschaft, which exclude secondary, are:—

1933.....	114,800 long tons
1934.....	118,000 " "
1935.....	120,400 " "

(d) Years ended March 31 of the year following that stated.

(e) Includes base bullion as follows:—

1933.....	45,871 long tons
1934.....	35,804 " "
1935.....	36,723 " "

Zinc

The Consolidated Mining and Smelting Company of Canada reported in February, 1936, that "good consumption continued until well into December, when unsettled economic conditions and seasonal slackening lowered the price to £14 11s. 3d., which was only slightly above the average for the year. Estimated world production was about 13 per cent above 1934 but consumption was sufficient to absorb the increase, leaving stocks practically unchanged. Statistically, we consider this metal to be in a better position than it was a year ago and, from the continued steady demand during January and February of 1936, we expect the current year to show price improvement".

A European view was expressed at the same time by O. W. Roskill, in "The Mining Journal" in part, as follows: "In the absence of any control of production since the dissolution of the Zinc Cartel, world output of zinc has shown a steady rising tendency, at any rate during the second half of the year, which has not been absorbed by a corresponding increase in consumption. Although the consumption of zinc for brass has expanded, the galvanizing industry has shown few signs of recovery. It is not surprising therefore, that there should have been reported rumours of a possible reformation of the Zinc Cartel. In fact, the Bieille Montagne Co., attempted to reconstitute the Cartel at the beginning of the year . . . It is clear that in the absence of any restriction scheme there is a strong probability that world production of zinc will increase still further during 1936. In addition to the countries already mentioned the allocation of a subsidy to the more efficient mines in France and North Africa, coupled with the French import duty on metallic zinc, must increase production in France, while the devaluation of the Belga has strengthened the competitive position of the Belgian industry. In fact the only important producing country which does not show an expanding tendency is Poland. There is, therefore, a strong incentive towards some form of control, if the price is to be maintained even at its present level, whatever may be the difficulties of instituting such control".

It is interesting to note in view of the comments referred to above that the average price of zinc in Canadian funds was estimated at 3.31 cents for the first six months of 1936 as compared with 2.80 cents for the corresponding period of 1935; also the production of the metal in Canada totalled 157,869,552 pounds valued at \$5,225,482 during the first half of the current year as against 154,678,039 pounds at \$4,245,286 during the first six months of 1935, or an increase of 2 per cent in quantity and 23 per cent in value.

Table 103.—Production of Zinc from Canadian Ores, by Provinces, 1926-1935

(For years 1898 to 1925, see 1928 report on the Mineral Production of Canada)

Year	Quebec		Manitoba		Saskatchewan		British Columbia		Canada	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
	\$		\$		\$		\$		\$	
1926.....	12,904,176	956,199					137,033,929	10,154,214	149,938,105	11,110,413
1927.....	17,189,046	1,064,690					148,306,479	9,186,103	165,495,525	10,250,793
1928.....	21,057,760	1,156,745					163,530,890	8,983,079	184,647,374	10,143,050
1929.....	19,653,440	1,058,731					172,096,841	9,270,857	197,267,087	10,626,778
1930.....	9,754,160	351,150	3,882,141	139,757			250,479,310	9,017,255	267,643,505	9,635,166
1931.....			35,173,749	898,338			202,071,702	5,160,911	237,245,451	6,059,249
1932.....			41,736,600	1,604,016			130,546,958	3,140,438	172,283,558	4,144,454
1933.....			43,516,037	1,397,082	2,789,683	89,563	152,826,264	4,906,487	199,131,984	6,393,132
1934.....			47,264,342	1,438,538	2,162,938	65,831	249,152,403	7,583,202	298,579,683	9,087,571
1935.....	5,322,844	164,955	51,129,980	1,584,513	8,974,720	278,126	255,222,315	7,909,314	320,649,859	9,936,908

Zinc-bearing ores were mined in Ontario prior to 1931; for production, see previous reports.

Table 104.—Refined Primary Zinc, Production in Canada 1926-1935

Year		Short tons	Year		Short tons
1926.....		61,727	1931.....		118,622
1927.....		73,208	1932.....		86,141
1928.....		81,765	1933.....		91,946
1929.....		86,048	1934.....		134,917
1930.....		121,496	1935.....		149,523

NOTE.—For years 1916 to 1925, see previous reports.

Tabel 105.—Available Statistics on the Consumption of Zinc in Specified Canadian Manufacturing Industries, 1934 and 1935

Industry	Items used	1934	1935
		Pounds	Pounds
Brass and copper products.....	Zinc castings..... Zinc ingots and bars..... Zinc plates, slabs and sheets.....	3,920,176	4,434,898
White metal alloys.....	Zinc scrap..... Zinc spelter.....	22,904 1,100,791	51,223 941,935
Electrical apparatus.....	Zinc scrap..... Zinc ingots and bars..... Zinc sheets.....	283,278 448,343 1,587,233	1,291,099 636,199 2,193,970
Paints and pigments.....	Zinc and zinc ore.....	1,762,565	2,813,565
Iron and steel.....	Zinc.....	19,017,095	20,449,488
Miscellaneous chemicals.....	Zinc sheet.....	67,724	52,977
Grand Total—Metal.....		28,210,109	32,865,354
Paints and pigments.....	Zinc oxide..... Leaded zinc oxides and zinc leads.....	2,438,544 2,130,219	2,476,286 1,944,073
Electrical apparatus.....	Lithopone.....	9,558,309	11,601,125
Toilet preparations.....	Zinc chloride..... Zinc oxide.....	252,545 64,540	348,756 70,232

Table 106.—Imports into Canada and Exports of Zinc, 1934 and 1935

	1934		1935	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS				
Zinc dust.....	1,067,300	61,135	1,648,100	80,837
Zinc in blocks, pigs, bars and rods, and zinc plates, n.o.p.....	18,300	1,282	18,100	2,111
Zinc in sheets and strips, and zinc plates for marine boilers.....	3,964,900	260,449	5,579,000	349,013
Zinc spelter.....	3,100	200	115,300	4,254
Zinc white (zinc oxide).....	11,754,090	520,911	11,768,314	460,122
Zinc sulphate.....	1,844,821	27,091	2,042,284	29,459
Zinc, chloride of.....	1,462,592	41,712	1,869,056	55,942
Zinc, manufactures of, n.o.p.....		82,883		128,536
Lithopone.....	14,530,612	510,558	17,383,273	620,615
Total.....		1,506,221		1,730,889
EXPORTS				
Zinc, contained in ore—				
To Belgium.....	9,388,800	175,550	6,329,300	124,118
Japan.....	8,947,500	140,657	2,175,500	23,486
United Kingdom.....	4,980,100	86,000	2,935,700	48,750
France.....	12,129,600	196,052	3,030,800	53,555
Germany.....	3,591,300	56,300	5,128,300	87,800
United States.....	6,100	276	600	23
Total.....	39,043,400	654,835	19,600,200	337,732
Zinc scrap, dross and ashes—				
To United Kingdom.....	942,600	16,511	669,300	14,144
United States.....	18,000	529	210,000	2,480
Japan.....	2,970,200	28,484	3,385,000	21,851
Other countries.....	359,800	3,015	2,003,200	25,244
Total.....	4,290,600	48,539	6,267,500	63,719
Zinc, spelter—				
To United Kingdom.....	181,075,000	5,251,861	222,213,700	6,406,584
United States.....	127,000	2,928	1,246,400	36,130
British India.....	4,167,100	117,383	2,744,100	69,185
Argentina.....	1,108,100	37,604		
Belgium.....	11,119,900	339,655	9,427,200	264,996
Brazil.....	459,500	14,639	1,198,900	37,749
China.....	2,089,100	68,250	3,671,100	109,437
France.....	1,669,700	42,709	3,103,600	87,416
Germany.....	851,700	26,443	44,800	1,618
Italy.....	2,240,900	64,202	1,120,100	29,692
Japan.....	30,842,300	958,823	25,436,900	745,229
Netherlands.....	1,792,600	56,062		
Other countries.....	851,500	10,080	712,000	21,655
Total.....	237,894,400	6,990,639	270,918,800	7,809,691
Grand Total—Exports.....		7,694,013		8,211,142

Table 107.—Monthly Average Prices of Zinc at Montreal, St. Louis and London, 1933-1935

Month	Montreal ¹ (In cents per pound)			St. Louis ² (In cents per pound)			London ² (In pounds Sterling per long ton)		
	1933	1934	1935	1933	1934	1935	1933	1934	1935
January.....	3-924	4-750	3-65	3-018	4-271	3-730	14-381	14-688	11-994
February.....	3-983	4-658	3-64	2-666	4-384	3-714	13-866	14-844	11-819
March.....	4-152	4-498	3-64	2-987	4-368	3-894	14-647	14-735	12-095
April.....	4-139	4-367	3-69	3-298	4-370	4-030	14-951	14-916	12-891
May.....	4-294	4-174	3-94	3-805	4-346	4-220	15-505	14-722	14-534
June.....	4-637	4-010	3-82	4-348	4-240	4-299	16-988	14-241	13-734
July.....	5-095	3-850	3-91	4-878	4-317	4-325	17-795	13-466	14-065
August.....	4-809	3-824	4-08	4-916	4-281	4-535	16-869	13-682	14-714
September.....	4-802	3-700	4-22	4-699	4-049	4-669	16-810	12-644	15-414
October.....	4-657	3-580	4-47	4-748	3-832	4-825	16-310	12-217	16-440
November.....	4-643	3-627	4-49	4-520	3-732	4-850	15-048	12-000	16-193
December.....	4-720	3-665	4-36	4-461	3-711	4-850	14-826	11-730	15-091
Average.....	4-488	4-059	3-99	4-029	4-158	4-328	15-666	13-657	14-082

¹ Supplied by Consolidated Mining and Smelting Co., Montreal, Que.² From the Engineering and Mining Journal.

The London zinc price, on the basis of which the greater part of the Canadian production is sold, when converted to Canadian funds, averaged 3-21 cents per pound in 1933; the corresponding figure for 1934 was 3-0436 cents and for 1935 it was 3-09899 cents.

Table 108.—World Metal Production of Zinc, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom (b)....	45,000	54,000	63,000	—Concluded			
Northern Rhodesia.....	18,542	19,540	20,680	Netherlands.....	18,186	19,597	13,530
Canada.....	82,095	120,462	133,128	Norway.....	44,238	44,316	44,308
Australia.....	53,956	54,629	67,666	Poland.....	81,399	91,453	83,270
Total.....	200,000	249,000	284,000	Spain.....	8,413	8,052	8,775
FOREIGN COUNTRIES				U.S.S.R. (Russia).....	16,357	26,722	45,000
Belgium.....	135,132	172,138	178,870	Yugoslavia (e).....	2,984	4,299	3,302
Czechoslovakia.....	6,501	7,513	9,511	Mexico.....	26,400	28,568	31,632
France.....	51,136	46,502	46,692	United States (c).....	274,270	324,634	375,566
Germany (b) (d).....	50,000	70,072	121,252	China.....	145	134	(a)
Italy.....	22,915	24,471	27,143	French Indo-China.....	3,198	4,174	3,842
				Japan.....	30,173	31,638	33,651
				Total.....	770,000	900,000	1,030,000
				World's Total.....	970,000	1,150,000	1,310,000

(a) Information not available.

(b) Includes some secondary metal.

(c) The production by grades (including redistilled secondary) was as follows (long tons):—

	1933	1934	1935
A.—High grade.....	93,609	104,214	138,854
B.—Intermediate grade.....	24,197	29,126	43,855
C. and D.—Select and brass special.....	51,177	38,979	44,562
E.—Prime Western.....	132,150	169,896	173,876

(d) The figures published by Metallgesellschaft (which exclude secondary) are (long tons).....

(e) Including zinc dust.

Table 109.—World Production of Zinc Ore, 1933-1935

(In terms of metal)

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	4	445	1,164	—Concluded			
Northern Rhodesia.....	(d) 18,542	(d) 19,540	26,902	Spain.....	35,000	31,000	33,000
Canada (shipments) (b).....	120,339	141,396	147,772	Sweden.....	24,346	28,664	31,184
Newfoundland.....	73,730	86,758	71,151	U.S.S.R. (Russia)			
India.....	55,400	54,800	58,200	(smelter).....	16,357	26,660	46,000
Australia.....	123,703	136,760	148,492	Portugal.....		18	
Total.....	392,000	440,000	454,000	Yugoslavia.....	58,326	52,967	52,000
FOREIGN COUNTRIES				Algeria.....	2,252	2,336	1,082
Austria.....	2,070	2,541	2,591	French Morocco.....	50		
Bulgaria.....	256	251	280	Tunio.....			200
Belgium (c).....	3,000	3,000	3,000	Mexico.....	87,928	123,209	133,873
Czechoslovakia.....	1,337	965	1,549	United States.....	343,107	391,720	462,833
Finland.....	1,067	1,000	1,008	Bolivia (exports).....	13,200	9,338	7,663
Germany.....	102,715	129,650	138,696	Chile.....	4		(a)
Greece.....	12,160	5,821	982	Peru.....	201	7,823	10,918
Italy.....	28,678	42,000	53,000	China.....	4,100	5,100	(a)
Norway.....	9,597	5,551	6,597	French Indo-China.....	4,910	4,881	4,970
Poland.....	35,000	40,000	53,000	Japan (c).....	15,000	20,000	18,000
Roumania.....	4,129	3,667	4,050	Korea (ore).....	3,142	2,883	2,218
				Turkey.....	3,758	7,791	7,207
				Total.....	810,000	940,000	1,060,000
				World's Total.....	1,200,000	1,380,000	1,510,000

(a) Information not available.

(b) The amount estimated as recoverable was:—

1933.....	88,898 long tons.
1934.....	133,295 " "
1935.....	143,147 " "

(c) Metallgesellschaft estimate.

(d) Smelter production.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production by provinces, imports, exports, prices and world output of nickel, copper and metals of the platinum group.

1. Definition of the Industry

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., Kristiansand, Norway, and Clydach, Wales.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production. Gold and silver in increasing quantities are also recovered from these ores.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 13 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production and trade statistics on nickel, copper and the metals of the platinum group are given in this chapter.

2. General Review

Finally revised statistics for 1935 show a total Canadian production of 138,516,240 pounds of nickel valued at \$35,345,103 as compared with 128,687,340 pounds worth \$32,139,425 in 1934 and 83,264,658 pounds at \$20,130,480 in 1933. The quantity of nickel produced in the Dominion, as compiled and published by the Bureau, includes the nickel in matte exported, electrolytic metal made at Port Colborne, Ontario, and the nickel in oxides and salts produced in Canadian plants. The 1935 output of nickel was the largest in the history of the Canadian nickel mining industry, surpassing 1934, the previous high record year, by 7.6 per cent and of the total value of all metals produced in the Dominion throughout 1935, the value of nickel comprised 16 per cent, being surpassed only by that of gold.

Employees in the industry totalled 7,009 during 1935 or an increase of 24.8 per cent over 1934. Salaries and wages amounted to \$11,275,650 as compared with \$8,864,772 in 1934 while the cost of fuel and electricity consumed increased from \$4,202,810 in 1934 to \$4,735,768 for the year under review. Exports of nickel and its products during 1935 totalled 1,427,265 cwt. valued at \$36,285,482, representing a pronounced increase over the preceding year's exports of 1,181,521 cwt. appraised at \$28,913,230. The greater part of Canadian exports of nickel and its products is consigned direct to the United States and the United Kingdom; in 1935 the value of these exports to the former country amounted in value to \$16,117,522 while the same products going to the United Kingdom were valued at \$12,572,741.

Practically all of the nickel produced in Canada is derived from the copper-nickel bearing deposits of the Sudbury district, Ontario. Two companies operate mines and metallurgical plants in this area. The International Nickel Company of Canada, Ltd., conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treat their matte in a refinery at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Company is treated in plants located at Clydach, Wales; Huntington, West Virginia, and at Port Colborne and Copper Cliff, Ontario.

The International Nickel Company of Canada Limited reported that "during 1935 a total of 3,382,409 tons of ore was mined and shipped to smelters at Copper Cliff and Coniston, Ontario. All of this ore was extracted from the Froid and Creighton properties which were operated continuously throughout the year. The Froid mine furnished 2,875,599 tons and the Creighton mine, 506,810 tons.

Development work in the Froid mine was carried on at a rate to conform to ore requirements. The advance of shafts, drifts and cross-cuts, raises, winzes and box holes for the year was 16,012 feet, bringing the total development footage in this mine to 183,211. There are now available for production 103 stopes and 16 pillar stopes having respectively a daily capacity of 125 tons and 55 tons each.

In the Creighton mine development work was advanced 9,200 feet. Good progress was made in shaft sinking and surface plant construction. It is expected that ore from this development will be available in 1937. The new shaft, 16 feet by 28 feet in cross section, is being sunk to a depth of 4,200 feet and will be served by a hoist capable of handling 4,000 tons of ore per day.

By replacing mild steel skips with lighter skips made from nickel steel the hoisting capacity at the Froid and Creighton mines has been increased approximately fifteen per cent.

The concentrator treated 2,584,666 tons of ore, the largest tonnage handled since this plant was built. Milling was increased to 8,000 tons per day and it is planned to expand capacity to 11,000 tons per day during 1936.

At the Copper Cliff smelter there were produced 118,016 tons of bessemer matte and 121,574 tons of blister copper. All of the reverberatory furnaces, five in number, and all twelve converters, were in use from February until the end of the year. The Orford process department was operated throughout the year with improvement in costs partly due to the increased tonnage of bessemer matte consumed.

The Coniston smelter with the exception of the month of July ran continuously with four blast furnaces and five converters in operation. Ore to the amount of 790,351 tons was processed and 54,248 tons of bessemer matte produced.

Increased demand for nickel necessitated operating the electrolytic plant at Port Colborne, Ontario, at capacity for the first time since additional units were installed in 1929. The year began with six circuits in service to which were added during the year the three reserve circuits, thus bringing the refinery to maximum strength. There was produced 80,381,532 pounds of nickel in all forms.

There was a substantial increase in the tonnage of blister copper treated at the electrolytic copper refinery of the Ontario Refining Co. Ltd., (subsidiary) and plant output and copper shipments from this Copper Cliff plant increased correspondingly. Refined copper production was 109,966 tons comparable with 95,558 tons in 1934. A new selenium plant was completed and put in operation in March, 1935; in order to eliminate silver losses and to further increase recovery of selenium, a Cottrell electrical precipitator was installed and showed satisfactory results; a plant to produce "single" and "double" nickel salts for the Canadian market was authorized in 1935 and is now completed and in operation.

The output of nickel in the form of pellets was 28,579,015 pounds at the Clydach nickel refinery in Wales (Mond Nickel Co. Ltd.), comparable with 25,568,644 pounds in the preceding year. In addition 2,504,902 pounds of metal was absorbed in the production of 12,136,255 pounds of nickel salts for which there is a steadily growing demand for nickel plating and in soap and edible oil manufacture. With the re-conditioning and remodelling of another unit, shortly to be completed, this refinery will have an annual capacity of 42,000,000 pounds of metallic nickel. The small high-pressure carbonyl plant has passed from the experimental to the production stage and is proving a valuable auxiliary to the refinery.

The precious metals research and development department at the Acton (Mond Nickel Co., England) plant continued its investigations into the use of platinum metals and their alloys. Sales of "monel metal" by Henry Wiggin & Co., Ltd., (subsidiary of Mond Nickel Co., Ltd., England) continued to expand and now comprise nearly 30 per cent of this company's total sales.

At the Huntington works of the International Nickel Co. Inc., located in West Virginia, U.S.A., shipments of rolled nickel "monel metal", "Inconel" and other nickel alloys totalled 23,387,507 pounds comparable with 20,699,680 pounds in 1934, an increase of 13 per cent.

The total number of employees at the end of 1935 was 12,452 distributed as follows: Canada, 8,117; Great Britain, 2,990; United States, 1,293; other countries, 52. Employees on December 31, 1934, numbered 9,154. The increase, amounting to 36 per cent, was due to the increased scale of operations and to the construction work in progress in Canada and Great Britain. Proven ore reserves at December 31, 1935, were 205,590,592 tons.

The International Nickel Co. of Canada Ltd., realized a net profit of \$26,086,527.47 in 1935 after all charges, including provision for taxes, depreciation, mine depletion and other purposes. After payment of preferred dividends of \$1,933,898.75 there remained \$24,152,628.72 or \$1.65 per share of common stock.

During the summer of 1935, under the terms of the agreement between the Mond Nickel Company Ltd., and the Government of Finland, exploratory work was started on the Petsamo concession. Permanent camps were established and a road was built from the state highway to the most promising prospecting areas. The concession was surveyed in conformity with the Finnish ordinance survey and a geological reconnaissance was made and diamond drilling started; an estimate indicates that \$80,000 will be expended in Finland during 1936.

It was announced in June, 1936, that the electrolytic nickel refinery at Port Colborne, Ontario, was being enlarged to increase its production capacity by 50 per cent, raising the maximum capacity of the plant to approximately 12,000,000 pounds of electrolytic nickel per month.

Falconbridge Nickel Mines Ltd., reported 1935 operations as follows: "Practically all lateral work along the ore zone was confined to the 500 and 1,200 foot levels. On the former, an advance of 986 feet was made easterly in ore averaging 15.1 feet in width, though of slightly below mine average grade. This drive continues in ore at 1,600 feet from No. 5 shaft. On the 1,200 foot level. 153 feet and 807 feet were driven east and west respectively, from No. 5 shaft in ore of mine average grade, with a mean width of 12.5 feet. Both these faces continue in ore. No. 5 shaft was deepened 856 feet to a point slightly below the 1,400 foot level. Stations were established on the 200, 325, 1,200 and 1,400 foot levels and a loading station commenced at 1,350 feet. Steps were taken during the year to abandon the shrinkage method of mining and adopt the cut and fill system, with the conversion of active shrinkage stopes to the new practice. In preparation for this, as well as to back-fill the old stopes as they are emptied, a fill pass system was established near No. 1 shaft and two further series of passes were commenced. Total ore reserves were computed December 31, 1935, at 4,059,475 tons. From 337,543 tons of ore delivered to the crushing plant in 1935, 35,206 tons or 10.4 per cent of waste was eliminated by sorting. The balance amounting to 302,337 tons, was transported over the aerial tramway to the treatment plant bins.

The reduction plant operations during 1935 are tabulated as follows:—

Total ore treated.....	302,510 short tons
Matte produced.....	10,029.50 short tons
Nickel in matte produced.....	5,651.55 short tons
Copper in matte produced.....	2,597.26 short tons
Metals per ton in ore.....	40.97 lb. nickel and 19.71 lb. copper
Metallurgical losses per ton of ore.....	3.43 lb. nickel and 2.54 lb. copper

The refinery of the company located in Norway operated very steadily throughout the year, keeping step with the somewhat increased matte production. A certain amount of additions and alterations took place, which raised the total capacity of the plant, including capacity for custom ore, to 7,000 short tons of nickel annually, at which rate it occasionally operated; the plant for separation of precious metals started delivery of gold, silver, platinum and palladium. Net sales by the company totalled \$4,640,372.57 and it is stated that forward bookings for 1936 deliveries are again higher than in prior years. The Fahlralloy Canada, Ltd., financed by Ventures Limited and Falconbridge Nickel Mines Ltd., was recently reported to have taken over a plant located at Orillia, Ontario, where equipment was installed for the manufacture of nickel-steels.

In Strathy township, Temagami district, Ontario, Cuniptau Mines Ltd., was active throughout the year and it was reported in June, 1936, that arrangements had been completed by this company for the sale of high grade matte to an English concern.

The British Columbia Department of Mines reports that development work during 1935 at the property of B.C. Nickel Mines, Choate, British Columbia, consisted of 6,300 feet of workings driven in the vicinity of No. 1 tunnel and 760 feet of raising. The latter is part of a program whereby five 300 foot raises will be put up above No. 1 tunnel and from which a thorough diamond drill campaign will be undertaken. During 1935, 56,000 feet of diamond drilling was done, of which 47,000 feet were driven from No. 1 tunnel, 8,000 feet from No. 2 adit, and 1,000 feet from the surface, to explore areas indicated by magnetometer survey. It is also interesting to note that nickeliferous serpentine occurring near Williams lake, British Columbia, has been recently investigated as to its economic importance; the nickel content in certain sections is reported to approximate 0.20 per cent.

Table 110.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1933-1935

	1933	1934	1935
Number of firms.....	4	4	4
Number of mines.....	7	7	7
Number of smelters.....	3	3	3
Number of refineries.....	1	1	1
*Capital employed..... \$	84,836,327	88,574,427	87,015,617
Number of employees—On salary.....	191	223	245
On wages.....	3,407	5,394	6,764
Total.....	3,598	5,617	7,009
Salaries and wages—Salaries..... \$	617,599	740,191	800,700
Wages..... \$	4,971,011	8,124,581	10,474,950
Total..... \$	5,588,610	8,864,772	11,275,650
Estimated gross value of matte exported and Canadian refinery products..... \$	25,052,622	52,906,920	58,996,451
Fuel and electricity used (c)..... \$	2,592,216	4,202,810	4,735,768
Process supplies used (b)..... \$	(a)	(a)	7,181,698
Value of production less items (b) and (c)..... \$	(a)	(a)	47,078,985

*Not including ore reserves.
(a) Information not available.

Table 111.—Output from Canadian Nickel-Copper Mines and Metallurgical Plants, 1933-1935

	1933	1934	1935
	Tons	Tons	Tons
Ore mined.....	1,613,956	2,989,988	3,699,945
Ore milled†.....	1,045,210	1,927,001	2,701,655
Refined nickel* produced in Ontario.....	20,748	35,487	40,191
Blister copper produced in Ontario (a).....	60,398	95,826	119,720
Matte exported.....	43,315	46,755	47,961
Nickel content of matte.....	20,811	28,771	29,044
Copper content of matte.....	12,323	6,692	7,414

*Includes nickel in salts and oxides and in refined nickel.
†In addition crude ore was smelted direct.
(a) Copper content.

Table 112.—Proportion of Nickel and Copper in Sudbury Matte, 1926-1935

Year	Percentage			Year	Percentage		
	Nickel	Copper	Total		Nickel	Copper	Total
1926.....	49.6	30.6	80.2	1931.....	40.5	38.7	79.2
1927.....	48.4	31.7	80.1	1932.....	40.7	38.4	79.1
1928.....	47.6	32.6	80.2	1933.....	44.7	31.6	76.3
1929.....	44.0	35.1	79.1	1934.....	44.4	32.9	77.3
1930.....	36.6	42.5	79.1	1935.....	44.9	31.8	76.7

NOTE.—For years 1912 to 1925 see previous reports.

Table 113.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1934 and 1935

—	1934				1935			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees—								
Mine and mill.....	52	1	53	167,030	53	2	55	164,976
Smelters and refinery.....	134	36	170	573,161	150	40	190	635,724
Total.....	186	37	223	740,191	203	42	245	800,700
Wage-earners—								
Mine and mill.....	2,624		2,624	4,208,672	3,497		3,497	5,894,431
Smelters and refinery.....	2,770		2,770	3,915,909	3,267		3,267	4,580,519
Total.....	5,394		5,394	8,124,581	6,764		6,764	10,474,950
Grand total.....	5,580	37	5,617	8,864,772	6,967	42	7,009	11,275,650

Table 114.—Wage-Earners Employed by Months, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1932 to 1935

—	1932	1933	1934	1935
January.....	3,014	1,822	4,811	5,666
February.....	3,019	1,957	4,876	5,804
March.....	3,039	2,036	5,048	6,077
April.....	2,577	1,976	5,189	6,277
May.....	2,379	2,034	5,409	6,446
June.....	2,434	3,001	5,622	6,573
July.....	2,235	3,957	5,658	6,733
August.....	1,672	4,523	5,566	7,253
September.....	1,628	4,775	5,500	7,500
October.....	1,530	5,050	5,722	7,714
November.....	1,490	4,968	5,707	7,632
December.....	1,551	4,762	5,609	7,489

NICKEL

Production figures include nickel in matte or speiss exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts.

Table 115.—Production of Nickel from Canadian Ores, 1924-1935

(For years 1889 to 1923 see report on the Mineral Production of Canada, 1928)

Year	Pounds of nickel	Value	Year	Pounds of nickel	Value
		\$			\$
1924.....	69,536,350	19,470,178	1930.....	103,768,857	24,455,123
1925.....	73,857,114	15,946,672	1931.....	65,666,320	15,267,453
1926.....	65,714,294	14,374,163	1932.....	30,327,968	7,179,862
1927.....	66,798,717	15,262,171	1933.....	83,264,658	20,130,480
1928.....	96,755,578	22,318,907	1934.....	128,687,340	32,139,425
1929.....	110,275,912	27,115,461	1935.....	138,516,240	35,345,103

Table 116.—Production in Canada, Imports and Exports of Nickel, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$	Pounds	\$
PRODUCTION—						
Nickel in matte and speiss exported (a), refined and electrolytic nickel produced, and nickel in oxides and salts sold.....	83,264,658	20,130,480	128,687,340	32,139,425	138,516,240	35,345,103
IMPORTS—						
Nickel, nickel silver and German silver, in ingots or blocks, n.o.p.....	686,777	193,229	2,646	771	3,643	959
†Nickel in bars and rods, strips, sheets and plates.....	203,217	95,189	591,466	197,230	445,112	191,330
Nickel silver and German silver, in bars, rods, strips, sheets, plates or anodes.....	51,742	17,012	48,359	14,187		
Nickel chromium, in bars and rods.....	50,841	46,210	48,413	45,114	43,434	41,381
German, Nevada and nickel silver, manufactures of, not plated.....		127,076		140,682		
Nickel-plated household hollow-ware.....		1,900		9,075		
Nickel kitchenware.....		1,365		872		
Nickel-plated ware, n.o.p.....		569,862		753,421		814,456
Total nickel and its products.....		1,051,843		1,161,352		1,048,126
EXPORTS—						
Nickel, fine; nickel contained in ore, matte or speiss and nickel contained in oxide...	88,082,100	22,795,968	118,152,100	28,913,230	142,726,500	36,285,482

(a) Nickel in matte exported valued at 18 cents per pound.

†Not including bars or rods depolarized or otherwise processed for use as anodes.

Table 117.—World Production of Nickel Ore, 1933-1935

(In terms of metal)
(Supplied by the Imperial Institute)
(Long tons)

Producing country	1933	1934	1935
British Empire—			
Southern Rhodesia.....			57
Canada.....	37,172	57,450	61,838
India (b).....	973	1,209	1,465
Australia.....	9		
Total.....	38,200	58,700	63,400
Foreign Countries—			
Germany.....	(a)	(a)	268
Morocco (French Zone).....			183
U.S.S.R. (Russia).....		849	1,800
Brazil.....	31	33	5
Greece (e).....	1,355	1,046	(a)
Norway.....	979	1,312	1,216
United States (d).....	113	140	143
New Caledonia (c).....	4,860	8,500	6,200
Total.....	7,300	11,900	9,800
World's total.....	45,500	70,600	73,200

(a) Information not available.

(b) Nickel content of speiss obtained as a by-product in smelting operations.

(c) Estimated content of matte and ferro-nickel obtained at smelters was as follows:—

1933..... 4,000 long tons

(d) Nickel content of salts and nickel produced as a by-product in the electrolytic refining of copper (partly from imported blister copper.)

Secondary metal was recovered in the United States as follows:—

1933..... 1,500 long tons

1934..... 1,650 "

1935..... 1,750 "

(e) Figures represent combined totals of nickel content and cobalt content of ores.

NICKEL CONTAINED IN PRINCIPAL NICKEL ALLOYS

(Supplied by the International Nickel Company of Canada, Limited)

As guide to the part which nickel has in the industrial world through the alloys now being used in industry, the nickel content of the best known, alloys is shown in the following table:—

NON-FERROUS ALLOYS—	Per cent Nickel
Malleable Nickel.....	99
Monel Metal.....	67
Inconel.....	80
Heat Resistant Alloys (including Ferrous).....	35-85
Cupro-Nickel Alloys.....	15-50
Nickel Silvers.....	10-30
Nickel Brasses and Bronzes.....	$\frac{1}{2}$ -5
FERROUS ALLOYS—	
Nickel Steels.....	$\frac{1}{2}$ -7
Stainless Steels (Nickel-Chromium).....	7-35
Non-Magnetic Steels.....	10-25
Invar Type Steels.....	32-45
Nickel Wrought Iron.....	3
Nickel Cast Irons.....	$\frac{1}{2}$ -5
Ni-Resist Types.....	14-20
Ni-Hard.....	4-6
Ni-Tensyliron.....	1-2 $\frac{1}{2}$

The heat resisting alloys are practically all of a nickel-chromium-iron combination with small additions of other elements which impart special characteristics depending upon the type of application. There are a large number of these alloys, in which the nickel ranges from 10 to 80 per cent, which may be divided into the following types:—

Type	Nickel	Chromium
1.....	60-80	15-20
2.....	25-40	15-20
3.....	20-25	20-30
4.....	10-20	20-30

Mr. Robert C. Stanley, President of the International Nickel Company of Canada, Limited, in a review of the nickel industry in 1935 stated that:

"Applications of nickel in various forms continued to spread into the diversified fields which today constitute world industry. Whereas, for example, depression or prosperity among the makers of agricultural machinery used to have no effect on nickel, this particular industry is now a market for nickel alloy steels and cast irons. The broadening base of participation in industry at large has definitely become just as important a factor in nickel consumption as the increased rate of activity in such fields as automotive and food handling, where nickel and nickel alloys have long been established. This wider interest is reflected in the extent to which warehouses are now stocking nickel steels."

COPPER

Canada as a producer of new copper in 1935 was surpassed, in the order of their output, by only the United States and Chile. Production in the Dominion during 1935 totalled 418,997,700 pounds valued at \$32,311,960 as compared with an output of 364,761,062 pounds worth \$26,671,438 in 1934. The quantity produced during 1935 established a new all-time high record for Canadian copper production and the value was surpassed only by those for 1929 and 1930. Of the total metal produced in 1935, 79,050,906 pounds were credited to the province of Quebec, 252,027,928 pounds to Ontario, 38,011,371 pounds to Manitoba, 11,429,452 pounds to Saskatchewan, and 38,478,043 pounds to British Columbia. Production in British Columbia was

considerably less than in 1934, owing to cessation of copper mining and smelting at Anyox by the Granby Company; this decrease, however, was amply compensated for by increases in Quebec Ontario, Manitoba and Saskatchewan. The increase in copper output in Ontario was particularly pronounced, realizing a 23 per cent increase over 1934 and being 510 per cent greater than in 1926 or at the beginning of the last decade. This rapid increase in copper production in Ontario reflects the recent expansion in the nickel-copper mining and smelting industry of the Sudbury area.

Price of electrolytic copper in London averaged £31.261 per long ton for January, 1935 and with the exception of a few monthly variations rose steadily to an average of £39.313 for December and an average for the year of £35.430.

The metal in New York remained at 8.775 cents per pound from January to May, inclusive, following which the price realized monthly gains to 9.025 cents for both November and December, the average for the year being 8.649 cents. Transposed into Canadian funds, the average price of copper for 1935, based on the London market, was 7.795 cents per pound as compared with a corresponding price of 7.419 cents in 1934. The average price in Canadian funds, based on the London market, was 8.934 cents per pound for the first six months of 1936 as against 7.218 cents for the first half of 1935.

The value of Canadian exports of copper and its products increased from \$23,313,762 in 1934 to \$29,661,697 in 1935, the largest single item in both years being copper in ingots, bars, cakes, slabs and billets, the quantity of which in 1935 totalled 243,535,200 pounds valued at \$18,061,278 and of which 166,212,600 pounds were consigned to the United Kingdom.

An important event pertaining to the stabilizing of markets outside the United States was the meeting of foreign (other than United States producers) copper producers in New York on March 28, 1935. According to the Chairman of the Conference, the most important questions considered were production control, marketing methods and trade practices and accord was reached as follows: (1) a curtailment amounting to 240,000 tons of copper a year from current production to be made by June 1, 1935; (2) creation of an organization to compile complete statistical information, to the end that while an adequate supply of copper will be provided at all times, the accumulation of excess stocks will be avoided; (3) co-operation in foreign markets of producers other than those who have actively participated in the Conference has been assured; (4) uniform trade practices governing sales, deliveries, and terms of payment will be adopted; (5) each producer reserves freedom of action within the above limitations. There will be no pooling of sales or fixing of prices, but an effort will be made to insure stable markets and avoid wide fluctuations in price; (6) subject to certain contingencies, the term of the accord is for a period terminating on July 1, 1938.

The October 22, 1936, bulletin of "Metal and Mineral Markets", New York, states: "Foreign copper producers participating in the curtailment agreement announced on October 15, 1936, that production by the group would be increased 5 per cent, to 85 per cent of capacity. This is the third 5 per cent increase in the rate of production abroad in the current year . . . total stocks of refined copper abroad have been reduced since the beginning of 1936 by about 63,000 tons, the quantity on hand at the end of September amounting to 191,008 tons. Of the total on hand, only 112,800 tons are "industry stocks" or metal more or less controlled by producers. With apparent consumption outside the United States averaging around 83,000 tons a month, and surplus stocks reduced to less than the ideal three months' needs of consumers, the market abroad, statistically, continued in a strong position. Foreign producers who are not keen about a higher market for copper are convinced that production outside of the group now in control will increase as prices rise. Competition with other metals also becomes a factor of greater importance with each advance in prices, it is claimed".

It was stated in the London press on October 26, 1936, that the copper restriction committee announced that effective November 1, production would be raised from 85 per cent of agreed standard output to 95 per cent; this applies to Canadian, European, African and South American production only. At the same time, the major copper producing companies in the United States raised the price of domestic copper one-quarter of a cent to 10 cents a pound, the highest since March, 1931.

Table 118.—Production of Copper from Canadian Ores, 1926-1935

Year	Pounds	Value	Cents per pound	Year	Pounds	Value	Cents per pound
		\$				\$	
1926.....	133,094,942	17,490,300	*	1931.....	292,304,390	24,114,065	*
1927.....	140,147,440	17,195,487	*	1932.....	247,679,070	15,294,058	*
1928.....	202,696,046	28,598,249	*	1923.....	299,982,448	21,634,853	*
1929.....	248,120,760	43,415,251	*	1934.....	364,761,062	26,671,438	*
1930.....	303,478,356	37,948,359	*	1935.....	418,997,700	32,311,960	*

*Since 1926 the value of Canada's copper production was computed according to the note in Appendix.

NOTE.—For years 1886 to 1925, see previous reports.

Table 119.—Production of Primary Copper in Canada, by Provinces and by Sources, 1934 and 1935

	1934		1935	
	Pounds	\$	Pounds	\$
By Provinces—				
Quebec.....	73,968,545	5,487,948	79,050,906	6,162,350
Ontario.....	205,059,539	14,822,704	252,027,928	19,295,965
Manitoba.....	30,867,141	2,290,126	38,011,371	2,963,146
Saskatchewan.....	6,618,913	491,077	11,429,452	890,974
British Columbia.....	48,246,924	3,579,583	38,478,043	2,999,525
Total.....	364,761,062	26,671,438	418,997,700	32,311,960
By Sources—				
In blister and anode copper produced.....	334,703,227	24,832,061	386,840,587	30,155,849
In ores, concentrates and copper matte exported.....	16,674,356	1,237,120	19,612,674	1,528,889
In nickel-copper matte exported.....	13,383,479	602,257	12,544,439	627,222
Total.....	364,761,062	26,671,438	418,997,700	32,311,960

Table 120.—Production of Refined Copper in Canada, 1926-1935

Year	Tons	Year	Tons
1926.....	10,581	1931.....	92,183
1927.....	9,191	1932.....	90,077
1928.....	8,806	1933.....	112,245
1929.....	3,518	1934.....	149,261
1930.....	31,377	1935.....	173,290

NOTE.—For years 1916 to 1925 see previous reports.

Table 121.—Production of Copper Sulphate in Canada, 1926-1935

Year	Pounds	Year	Pounds
1926.....	404,862	1931.....	62,140
1927.....	566,825	1932.....	*900,220
1928.....	771,400	1933.....	*629,100
1929.....	617,430	1934.....	*733,720
1930.....	734,300	1935.....	*642,746

*Used by producer.

DOMINION BUREAU OF STATISTICS

Table 122.—Quantity and Value of Copper Produced in Canada, by Provinces, 1926-1935

(For production in previous years see Mineral Production of Canada, 1928)

Year	Quebec		Ontario	
	lb.	\$	lb.	\$
1926	2,674,058	368,886	41,312,867	4,828,964
1927	3,119,848	403,084	45,341,295	4,946,533
1928	33,697,949	4,909,791	66,607,510	8,770,149
1929	55,337,169	10,019,901	88,879,853	14,622,572
1930	80,310,363	10,425,891	127,718,871	15,187,259
1931	68,376,985	5,723,154	112,882,625	9,096,463
1932	67,336,692	4,296,216	77,055,413	4,407,928
1933	69,943,882	5,214,177	145,504,720	10,118,847
1934	73,968,545	5,487,948	205,059,539	14,822,704
1935	79,050,906	6,162,350	252,027,928	19,295,965
Year	Manitoba		Saskatchewan†	
	lb.	\$	lb.	\$
1926				
1927				
1928				
1929				
1930	2,087,609	215,018		
1931	45,821,432	3,835,254		
1932	52,706,861	3,362,803		
1933	38,163,181	2,844,989	3,223,941	240,338
1934	30,867,141	2,290,126	6,618,913	491,077
1935	38,011,371	2,963,146	11,429,452	890,974
Year	British Columbia		Yukon	
	lb.	\$	lb.	\$
1926	89,108,017	12,292,450		
1927	91,686,297	11,845,870		
1928	102,283,210	14,902,664	*107,377	15,645
1929	103,903,738	18,772,778		
1930	93,318,885	12,114,657	42,628	5,534
1931	65,223,348	5,459,194		
1932	50,580,104	3,227,111		
1933	43,146,724	3,216,502		
1934	48,246,924	3,579,583		
1935	38,478,043	2,999,525		

*Includes small quantities produced in 1925, 1926 and 1927, but not reported until 1928.

†The metal is recovered from that part of the Flin Flon mine situated on the Saskatchewan side of the Manitoba-Saskatchewan border.

Table 123.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1934 and 1935

Industries	Item (Used)	1934	1935
Brass and copper products (b).....	Ingots, billets, slabs, etc.....lb.	64,445,050	50,652,274
	Castings.....lb.	39,517	1,663
	Pipe and tubing.....lb.	172,488	165,177
	Bars and rods.....lb.	32,580,001	24,381,496
	Plates and sheets.....lb.	447,476	497,964
	Wire.....lb.	312,668	379,889
	Scrap.....lb.	4,318,264	3,136,426
	Other.....lb.	39,372	75,060
White metal alloys.....	Scrap.....lb.	1,898,265	1,571,355
	Copper bars, sheets, etc.....lb.	38,764	130,404
Electrical apparatus and supplies.....	Pig and bars.....lb.	36,503	22,874,396
	Rods.....lb.	21,369,673	
	Tubing and pipe.....lb.	294,685	434,131
	Sheets and plates.....lb.	193,502	235,944
	Wire, bare.....lb.	2,527,365	3,544,916
	Wire, other insulated.....\$	363,857	285,760
	Wire, enamelled.....\$	262,687	283,051
	Scrap.....lb.	(a)	62,743
Iron and steel and their products.....	Castings.....lb.	(a)	62,612
	Copper sheets, bars, etc.....lb.	4,807,470	5,920,923

(a) Data not available.

(b) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable and duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 124.—Imports into Canada and Exports of Copper, 1934 and 1935

	1934		1935	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires and electric cables for use only in the manufacture of such articles in their own factories.	410,300	49,228	611,500	72,117
Copper bars for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors, and copper rods for such manufacture, individual units of conductors not to exceed area of No. 7-0 gauge conductor.	64,800	5,624	6,600	700
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured, n.o.p.	242,200	31,097	120,800	20,435
Copper in blocks, pigs or ingots.	34,700	3,693	37,200	3,719
Copper, scrap, cathode plates.	26,700	1,256	16,300	1,416
Copper in strips, sheets or plates not polished or coated.	223,700	37,707	324,800	60,044
Copper tubing in lengths of not less than 6 feet, and not polished, bent, or otherwise manufactured.	329,275	74,887	362,778	81,193
Copper wire.	72,515	18,011	16,271	3,566
Copper wire cloth, or woven wire of copper.		1,803		3,242
Copper, manufactured of, n.o.p.		287,429		352,961
Copper, precipitate of, crude.	704	113	4,420	486
Anodes of nickel, zinc, copper, silver or gold.		1,067		3,810
Copper, sub-acetate of, or verdigris, dry.	2,844	554	6,613	1,062
Copper, sulphate of (blue vitriol).	5,527,499	170,303	5,518,899	161,092
Copper rollers and stones adapted for use in textile and paper printing.		53,222		71,836
Copper, sulphate of, dehydrated, for agricultural or spraying purposes.	42,050	3,295	32,100	2,747
Total.		739,289		840,426
EXPORTS—				
Copper, fine, contained in ore, matte, regulus, etc.	35,145,200	1,655,936	38,702,700	1,870,542
Copper blister.	26,962,200	2,113,200	73,356,300	5,589,624
Copper, old and scrap.	3,888,200	222,909	6,327,400	360,000
Copper in ingots, bars, cakes, slabs and billets.	187,554,000	13,943,724	243,535,200	18,061,278
Copper in rods, strips, sheets, plates and tubing.	57,903,100	4,801,979	36,516,100	3,065,480
Copper wire and cable.		323,683		469,552
Copper manufactures, n.o.p.		252,331		245,221
Total.		23,313,762		29,661,697
Copper coin, foreign.		1,932		1,596
Copper coin, Canadian.		43		93

Table 125.—Copper Prices, by Months, 1934, 1935 and 1936

Month	Copper (Electrolytic)							
	New York			London				
	1934	1935	1936	1934	1935	1936		
	(cents per pound)			(£ sterling per long ton		(a)	(£ sterling per long ton	(a)
January.	7-890	8-775	9-025	35-614	31-261	6-820	38-788	8-5986
February.	7-777	8-775	9-025	35-969	30-244	6-593	39-463	8-7981
March.	7-775	8-775	9-025	35-512	31-607	6-808	40-227	8-9403
April.	8-173	8-775	9-169	36-038	34-763	7-546	41-131	9-1210
May.	8-275	8-775	9-275	35-756	36-733	8-028	40-839	9-079
June.	8-594	8-634	9-275	35-339	34-039	7-511	40-357	9-0673
July.	8-775	7-775	9-352	32-778	34-261	7-698	41-228	9-2524
August.	8-775	7-979	9-525	31-483	35-976	8-006	42-375	9-5088
September.	8-775	8-504	9-525	30-556	37-952	8-421	43-267	9-7331
October.	8-775	8-967	9-563	29-478	39-609	8-802	45-295	9-9026
November.	8-775	9-025	10-161	30-222	39-396	8-754	48-467	10-5626
December.	8-775	9-025	10-763	31-086	39-313	8-732	50-364	10-663
Average.	8-428	8-649	9-474	33-319	35-430	7-795	42-650	9-4770

(a) Equivalent in cents per pound expressed in Canadian funds.

Transposed into Canadian funds the average price of copper based on the London market was 7-4193 cents per pound in 1934; 7-79542 cents in 1935 and 9-4770 cents for 1936.

Table 126.—Canadian Copper Ore Reserves (†) as Officially Reported

(American Bureau of Metal Statistics)

	Year	Province	Short tons ore	Average grade	Short tons copper
				%	
Falconbridge.....	1935	Ontario.....	4,059,475	0.97	39,400
Granby Consolidated (a)-Allenby.....	1935	British Columbia...	9,885,069	1.61	159,200
Hudson Bay.....	1935	Manitoba.....	24,770,000	2.10	520,200
International Nickel.....	1935	Ontario.....	205,590,592	(b) 2.00	4,111,800
Noranda.....	1935	Quebec.....	31,029,000	2.51	779,100
Normetal.....	1933	Quebec.....	625,000	3.00	18,800
Sheritt Gordon.....	1932	Manitoba.....	4,799,175	2.41	115,900
Waite Amulet.....	1933	Quebec.....	1,067,350	6.00	64,000
Britannia.....		British Columbia...	(c)	(c)	(c)
Consolidated Copper and Sulphur.....		Quebec.....	(c)	(c)	(c)
Aldermac Mines Ltd.....	1935	Quebec.....	1,743,760	2.00	34,900

† Producing or developed for production.

(a) Anyox properties now closed.

(b) Approximate.

(c) Information not available.

Table 127.—World Production of Copper Ore, 1933-1935

(In terms of metal)

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES —concluded			
United Kingdom.....	40	14	50	Roumania.....	23	88	120
Northern Rhodesia...	129,423	157,599	168,659	Spain.....	29,000	30,000	30,000
Union of South Africa.	8,250	7,738	10,529	Sweden.....	6,762	4,982	6,287
Canada.....	133,921	162,840	187,053	U.S.S.R. (Russia)...	32,200	43,400	60,000
Newfoundland.....	3,167	4,229	2,910	Yugoslavia.....	33,500	42,300	41,000
Cyprus (estimated)...	4,200	4,000	12,232	Algeria.....	17	134	18
India (estimated).....	10,700	11,500	11,100	Angola (estimated) ..	50	20	(a)
Australia.....	14,413	12,012	16,990	Belgian Congo (smelter).....	65,544	108,346	105,981
Total.....	304,000	360,000	410,000	French Equatorial Africa.....	2,952	98	.....
FOREIGN COUNTRIES				Cuba.....	8,815	6,094	6,850
Austria.....	131	82	54	Mexico (b).....	39,196	43,569	38,751
Bulgaria.....	128	130	146	United States (b)...	170,217	211,969	329,930
Czechoslovakia.....	.....	160	240	Bolivia (exports)...	1,819	1,596	1,883
Finland.....	5,582	8,666	11,380	Chile (b).....	160,814	252,646	265,000
France.....	221	325	(a)	Panama.....	3	116	39
Germany.....	30,988	25,560	26,987	Peru.....	30,773	27,283	30,237
Greece.....	2	169	65	China (smelter)....	475	463	(a)
Hungary.....	310	224	240	Formosa (estimated)	4,000	4,000	4,000
Italy.....	324	320	330	Japan (smelter).....	67,942	65,944	68,215
Norway.....	19,500	20,800	20,190	Korea.....	900	1,400	2,200
Portugal (estimated) ..	2,000	2,000	2,000	Total.....	710,000	900,000	1,050,000
				World's Total....	1,020,000	1,260,000	1,460,000

(a) Information not available.

(b) Amount estimated as recoverable.

Table 128.—World Metal Production of Copper, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES —concluded			
United Kingdom.....	11,100	11,200	12,400	Norway.....	6,588	7,863	8,305
Northern Rhodesia..	104,205	137,897	143,501	Roumania.....	446	199	963
Union of South Africa.	8,236	8,196	11,449	Spain.....	16,995	13,559	11,379
Canada (c).....	116,244	149,423	172,678	Sweden.....	6,660	7,980	8,677
India.....	4,800	6,300	6,900	U.S.S.R. (Russia)...	43,593	52,491	60,000
Australia.....	11,238	7,970	11,168	Yugoslavia.....	39,721	43,669	38,384
Total.....	256,000	321,000	358,000	Belgian Congo.....	65,544	108,346	105,981
FOREIGN COUNTRIES				Mexico.....	39,300	42,410	37,592
Austria.....	995	587	1,316	United States.....	223,634	247,257	372,646
Belgium.....	34,802	60,135	80,429	Peru.....	154,749	243,808	255,821
Czechoslovakia.....	767	623	(a)	China.....	24,775	27,590	29,607
France.....	135	592	(a)	Formosa.....	1,344	2,300	(a)
Germany (b).....	49,000	52,200	55,100	Japan.....	67,942	65,944	68,215
Italy.....	118	446	(d) 63	Korea.....	772	1,412	2,135
				Total.....	780,000	980,000	1,140,000
				World's Total....	1,040,000	1,300,000	1,500,000

(a) Information not available.

(b) Metallgesellschaft figures.

(c) Copper content of blister copper.

(d) 8,183 long tons of secondary copper were also produced

METALS OF THE PLATINUM GROUP

The production of new platinum, palladium and other metals of the platinum group in Canada during 1935 totalled 190,146 fine ounces valued at \$5,408,667 as compared with the all-time high record of 200,162 fine ounces worth \$6,190,045 in 1934. With the exception of a relatively few ounces of alluvial platinum produced annually in British Columbia, the output of platinum metals in Canada represents recoveries made in the treatment of nickel-copper ores mined in the Sudbury area of Ontario.

The increasing production of the platinum metals in Canada reflects directly the great development programmes conducted during recent years by both of the large nickel-producing companies. Falconbridge Nickel Mines Limited reported that the departure in 1935 into the field of isolating and refining their precious metals, each for separate marketing—instead of selling a mixed concentrate—began to yield marketable production in the company's refinery located at Kristiansand, Norway; the quality was found satisfactory, and the marketing took place without difficulty. At Acton, in England, efficiency in the platinum metals refinery of the Mond Nickel Company Limited was well maintained according to the annual report (1935) of the International Nickel Company of Canada Limited; this was shown by the low cost of production as well as by the high purity of the metals produced. The precious metals research and development department at Acton continued its investigations into the use of platinum metals and their alloys; the company stated that the markets for the platinum metals were active throughout the year and the price of platinum, about \$34 per ounce at the beginning of the year, fluctuated slightly and rose to about \$38 at the end of the year; the price of palladium remained substantially unchanged at \$24 throughout the year. An upturn in the jewellery market, as well as continued demand from the chemical field, contributed to the demand for these metals. In consequence of better recognition by dentists of the improvements in the quality of dental gold alloys conferred by platinum and palladium, increasing amounts of both these precious metals were required in dental alloys for wrought and cast restoration parts and for dental clasps and other purposes.

A remarkable advance in the price of platinum was experienced during 1936 when on September 18, the London quotation for the metal approximated £13 10s. or \$68.29 per fine ounce in Canadian funds, later declining to \$55.75 by October 3. "Metal and Mineral Markets", New York, commented on the situation in August as follows: "Though the demand for platinum against normal requirements of consumers has increased this year along with the general recovery

in business, and prices have strengthened, the recent advance of \$10 per ounce in a single day was not welcomed in platinum circles. The sharp advance on August 18 to \$53 per ounce resulted chiefly from speculative activities. Literature has been distributed to probable buyers informing them that refined platinum is now available in convenient three ounce bars, properly assayed and stamped by a recognized dealer in the metal as to weight and fineness. The bars, it is stated, may be deposited in a bank and certificates issued against the platinum to facilitate trading. Speculation in platinum by the uninformed, producers fear, will do more harm than good to the industry".

During recent years, leaf palladium has been used in the same manner as leaf silver and gold; palladium alloys chiefly white in color, are utilized largely in the manufacture of jewellery; palladium is also employed as dental metal, as contacts in the electrical industry and as a catalyst. The industrial use of platinum is increasing; crucibles made of the metal are employed largely in laboratory work; platinum and platinum-gold and palladium-gold alloys are used for spinnerets in the rayon industry and it is stated that both platinum and rhodium-platinum have proved satisfactory for use in resistance furnaces where temperatures of 2,370 degrees F. or higher are encountered. Improvements in the plating of platinum, rhodium and palladium have been reported and it is suggested that precious clad metals and plated surfaces will soon be made use of in the chemical industry.

According to the United States Bureau of Mines, "it is estimated that the world's known workable deposits of platinum can supply annually a production of about 400,000 ounces of new platinum and about 70,000 ounces of palladium; Canada can furnish about 125,000 ounces of platinum; Columbia, 50,000 ounces; U.S.S.R. (Russia), 150,000 ounces; Union of South Africa 50,000 ounces; and the rest of the world, about 25,000 ounces; Canada also can produce about 60,000 ounces of palladium annually and the remainder of the world, about 10,000 ounces".

The Department of Mines, of the Union of South Africa, reports that during 1935, in addition to the platinum contained in the osmiridium recovered in the treatment of gold ores, mining for platinum per se was carried on in the Rustenburg district. The estimated content of platinum metals contained in crude platinum and concentrates produced totalled 31,272 fine ounces; 31,338 fine ounces of platinum metals were sold, comprising platinum, 24,364 ounces; palladium, 4,957 ounces; iridium, 16 ounces; osmium and osmiridium, 0.43 ounces; ruthenium, 284 ounces; and gold, 1,715 ounces.

Table 129.—Production of Platinum Group Metals in Canada, 1933, 1934 and 1935

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	\$	Fine ounces	\$
1933				
Ontario.....	24,746	856,190	31,009	645,043
British Columbia.....	40	1,400		
Total.....	24,786	857,590	31,009	645,043
1934				
Ontario.....	116,177	4,488,712	83,932	1,699,282
British Columbia.....	53	2,051		
Total.....	116,230	4,490,763	83,932	1,699,282
1935				
Ontario.....	105,335	3,444,455	84,772	1,962,937
British Columbia.....	39	1,275		
Total.....	105,374	3,445,730	84,772	1,962,937

Table 130.—Production of Metals of the Platinum Group, 1926-1935

(From 1887 to 1925 see Mineral Production of Canada, 1928)

Year	Platinum				Palladium	
	Lode		Placer			
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1926.....	9,471	919,349	50	4,258	9,790	626,166
1927.....	11,217	716,653	11	960	11,247	541,319
1928.....	10,483	706,090	49	2,819	11,909	511,998
1929.....	12,491	845,057	28	1,699	12,408	471,614
1930.....	34,007	1,542,490	17	771	29,959	689,217
1931.....	44,725	1,595,117	50	1,783	39,313	786,260
1932.....	27,284	1,097,021	59	2,372	29,727	548,582
1933.....	24,746	856,190	40	1,400	*31,009	645,043
1934.....	116,177	4,488,712	53	2,051	*83,932	1,699,228
1935.....	105,335	3,444,455	39	1,275	*84,772	1,962,937

* Since 1933 includes other platinum metals except platinum.

Table 131.—Production of Certain Metals of the Platinum Group, 1926-1932*

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1926.....	204	9,969	16	791	.....	.....	14	3,252
1927.....	222	6,853	31	1,073	.....	.....	45	4,945
1928.....	895	20,951	561	16,331	.....	.....	342	78,553
1929.....	3,037	151,850	1,376	66,048	.....	.....	497	119,777
1930.....	(a) 4,133	206,650	.....	.....	.....	.....	.....	.....
1931.....	(a) 7,605	431,457	.....	.....	.....	.....	.....	.....
1932.....	(a) 7,886	353,308	.....	.....	.....	.....	.....	.....

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

* Since 1933 these metals are included with palladium as shown in preceding table.

Table 132.—Imports into Canada and Exports of Platinum, 1933, 1934 and 1935

	1933		1934		1935	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
IMPORTS—						
Platinum retorts, pans, etc.....		11,809		1,029		14,355
Platinum wire, and in bars, strips, etc. (x).....		49,136		51,530		55,878
Platinum crucibles.....		11,435		11,464		7,665
Total.....		72,380		64,023		77,898
EXPORTS—						
Contained in concentrates, etc.....		1,168,565		5,186,489		5,055,901
Platinum, old and scrap.....	189	5,439	410	12,202	618	25,617
Total.....		1,174,004		5,198,691		5,081,518

(x) Includes any other of the platinum metals.

Table 133.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1932-1935

Year	Value	Year	Value
	\$		\$
1932.....	26,928	1934.....	38,307
1933.....	35,714	1935.....	45,627

Table 134.—Platinum Metals Sold in the United States, as Reported by Refiners and Shown by Consuming Industries, 1934 and 1935(From *Minerals Year Book*, U.S. Bureau of Mines)

(In Troy ounces)

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1934						
Chemical.....	14,699	285	53	89	15,126	16
Electrical.....	3,587	4,468	544	59	8,658	9
Dental.....	6,776	19,555	69	11	26,411	28
Jewellery.....	32,959	6,015	2,246	380	41,600	43
Miscellaneous.....	3,113	506	164	326	4,109	4
Total.....	61,134	30,829	3,076	865	95,904	100
1935						
Chemical.....	13,404	69	102	1	13,576	11
Electrical.....	5,867	5,490	662	276	12,295	10
Dental.....	9,694	20,916	130	43	30,783	25
Jewellery.....	56,182	5,095	3,508	579	65,364	52
Miscellaneous.....	2,505	200	95	246	3,046	2
Total.....	87,652	31,770	4,497	1,145	125,064	100

Table 135.—World Production of Platinum Metals, 1933-1935(Supplied by *Imperial Institute*)

(Troy ounces)

Country and product	1933	1934	1935	Country and product	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES			
<i>Sierra Leone</i> —				<i>U.S.S.R. (Russia)</i> —			
Crude platinum.....	431	474	750	Crude platinum (estimated).....	100,000	100,000	100,000
<i>Union of South Africa</i> —				<i>Abyssinia</i> —(b)			
Crude (Pt. metals content).....		26,370	19,954	Platinum (crude).....	6,650	5,612	5,350
Concentrates (Pt. metals content).....	2,386	11,372	11,318	<i>United States</i> —(a)			
Osmiridium (crude) (c)...	6,712	5,088	5,047	Platinum (crude).....	1,266	3,720	9,069
<i>Canada</i> —				New platinum metals recovered by refineries from domestic gold and copper ores—			
Crude platinum (Pt. content).....	40	53	39	Platinum.....	1,050	1,062	1,361
Recovered from Ontario nickel-copper matte—				Palladium.....	698	1,271	1,115
Platinum.....	24,746	116,177	105,335	Iridium, Osmiridium, etc.....	9	2	7
Other platinum metals.	31,009	83,932	84,772	<i>Colombia</i> —			
<i>New South Wales</i> —				Platinum (crude).....	45,971	54,768	38,628
Crude platinum.....	113	180	98	<i>Japan</i> —			
<i>Tasmania</i> —				Platinum (crude).....	206	118	51
Osmiridium (crude).....	548	488	235	<i>Belgian Congo</i> —			
<i>New Zealand</i> —				Palladium.....	559	3,588	5,144
Crude platinum.....	4		14	Platinum.....		1,260	965
<i>Papua</i> (years ended June 30)—				<i>Panama</i> —			
Osmiridium (crude).....	29	4	9	Platinum (crude).....			16
Platinum (crude).....		89	46				

(a) Secondary platinum metals were recovered in the United States as follows (Troy ounces):—

	1933	1934	1935
Platinum.....	35,073	35,494	47,107
Palladium.....	4,814	5,606	7,852
Iridium.....	692	1,328	2,191
Other Platinum metals.....	783	1,328	1,975

(b) Amount registered, which is probably not total production.

(c) It is estimated by the Department of Mines, Union of South Africa, that the osmiridium sold in these years contained the amounts of the metals mentioned below (fine ounces):—

	1933	1934	1935
Osmium.....	2,602	1,858	1,731
Iridium.....	2,082	1,706	1,501
Ruthenium.....	1,071	713	694
Platinum.....	876	670	594
Rhodium.....	30	30	29

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics, Showing Production by Provinces, Imports, Exports, Prices and World Output Tables
 on Aluminium, Antimony, Barium, Beryllium, Cadmium, Calcium, Chromite,
 Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products,
 Lithium, Magnesium, Manganese, Mercury, Molybdenum,
 Radium, Selenium, Tantalum, Tellurium, Tin,
 Titanium, Tungsten, Vanadium and
 Zirconium

1. General Review

Metal-bearing minerals, mined or treated in relatively small quantities by a comparatively few operators, have been grouped by the Bureau of Statistics for consideration as a single industry. Included with the finally revised statistics relating to the Canadian production of these are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals or metal-bearing ores produced in Canada during 1935 and classified as miscellaneous include bismuth, cadmium, chromite, manganese ore, radium and uranium products, selenium, tellurium and titanium ore. In addition to particulars relating to these metals or products, this chapter contains notes of a summary nature on beryl and beryllium, lithium, magnesium, tungsten, calcium, aluminium, tin, iron ores, vanadium, mercury, molybdenite and zirconium.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and for this reason such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry.

The iron and steel industry is one of the larger and better organized in Canada; ores utilized in Canadian iron furnaces are imported either from the Mesabi range in Minnesota, U.S.A., or from the Wabana deposits on Bell Island, Newfoundland. Iron ores consisting of hematite, siderite and magnetite occur in rather extensive deposits in Canada. These ores are usually of lower grade than those imported and their utilization in the Canadian steel industry would necessitate the employment of beneficiation methods. The Canadian aluminium industry is also very important; the production of this metal in the Dominion comes entirely from the province of Quebec. Bauxite, the crude aluminium ore employed in the manufacture of Canadian made aluminium, is mined in foreign countries.

For historical purposes and to provide the interested reader with available data, tables have been prepared for this chapter that set out the known facts regarding domestic and world production of these metals or ores.

Table 136.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1934 and 1935

—	1934			1935		
	Number of employees		Salaries and wages	Number of employees		Salaries and wages
	Male	Female	\$	Male	Female	\$
Salaried employees— Total.....	4	1	6,345	6	3	12,390
Wage-earners— Surface.....	29	.....	25,928	46	.....	51,222
Underground.....	8	.....		27	.....
Mill.....	2	.....		.....	.....
Total.....	39	.....	25,928	73	.....	51,222
Grand Total.....	43	1	32,273	79	3	63,612

Table 137.—Average Number of Wage-Earners Employed, by Months, 1934 and 1935

Month	1934	1935
January.....	13	42
February.....	36	55
March.....	34	73
April.....	17	62
May.....	25	51
June.....	41	79
July.....	42	80
August.....	44	78
September.....	62	83
October.....	60	92
November.....	45	86
December.....	37	85

2. Commodity Statistics on Aluminium, Antimony, Beryllium, Bismuth, Cadmium, Calcium, Chromite, Iron Ore, Pig-Iron, Ferro-Alloys, Steel and Rolled Products, Lithium, Manganese, Mercury, Molybdenum, Radium-uranium, Selenium, Tellurium, Tin, Tantalum, Titanium, Tungsten Vanadium, Zirconium

ALUMINIUM

Aluminium ores are not mined in Canada, however, the production of primary metallic aluminium in Quebec, from imported material, has constituted an important industry for several years. The Aluminum Company of Canada, Limited, the sole producer of new metal in the Dominion, operated its Shawinigan Falls fabricating plant continuously throughout 1935; the company's reduction works at Shawinigan Falls was inactive. The reduction plant of the company, located at Arvida, maintained steady production of aluminium ingot during the last calendar year. The slag ore works at Arvida was not operated in 1935.

The following information relating to recent developments at Arvida is taken from an article prepared by A. W. Whitaker, Jr., and which appeared in an early 1936 issue of "Canadian Chemistry and Metallurgy":—

"The Aluminum Company of Canada, Ltd., subsidiary of Aluminum Limited, is making an important extension to its plant at Arvida, Quebec, for the extraction of alumina from bauxite by the "Bayer" process. The new process will tie in with the existing "Hall-Hoopes" process and utilize certain steps, buildings and equipment which have been associated with it. The extension involves the construction of new buildings and the installation of equipment to a value exceeding \$1,000,000."

A bulletin issued by the Imperial Institute, London, contains the following information:—

"Silicates containing alumina as a major constituent occur widely distributed in nature, and a number of them, including kaolin, leucite, labradorite, nephelite, and various shales and clays, have been suggested as possible sources of alumina . . . the possibility of producing aluminium from silicates has been studied in Germany for some time, and under the present régime, research has been accelerated and small-scale experiments have been carried out which would enable a large-scale plant to be erected and worked, if occasion arose. At the present price of imported bauxite the clay processes cannot be economically operated, but if supplies were materially reduced or the price increased, they would be in a position to start production. The I. G. Farbenindustrie has an experimental plant at Bitterfeld equipped to produce aluminium from clay, using hydrochloric acid as a solvent. The solution obtained is saturated with hydrochloric acid gas, aluminium chloride free from iron is precipitated and ignited to yield alumina. The Vereingte Aluminiumwerke has developed an electro-thermal process and has purchased clay deposits at Bautzen which are stated to ensure raw material supplies for 100 years in case bauxite shipments fail . . . Japan has no bauxite deposits, but efforts to establish an aluminium industry, using silicate as raw material, have been made since 1915, when the Nippon Aluminum Co., began producing aluminium from silicate, but as the metal produced could not be obtained purer than 94 per cent, the process was abandoned. The Nippon-Manchukuo Aluminum Co., are now erecting a plant for the treatment of Manchurian clay, using the Suzuki process. The

aluminum works of the South Manchuria Railway Co., will employ the same process and raw materials. Suzuki's process is a development of Hall's dry process. The raw material is crushed and heated in an electric furnace with coke to reduce the ferric oxide and silica, which form a lower layer of ferro-silicon. The upper layer of alumina is removed, crushed, replaced in electric furnace, and heated to 500-600 deg., while a calculated amount of chlorine is passed through to convert the iron and silicon residue into chlorides which volatilize. The electrolysis of alumina is then carried out with cryolite as usual . . . There has been a rapid increase in the production of aluminium in the Soviet Republic in the last few years, and the extraction of the metal from domestic bauxite has developed to such an extent that it is claimed that the country is no longer dependent on foreign supplies. It has, however, been thought necessary to study the possibility of utilizing nephelite concentrates in a soda-lime fusion process and a mass production works is now under construction at Kandalaksha. The first section will have an output capacity of 40,000 tons of aluminium, the nephelite treated being a by-product in the working of apatite . . . The possibility of utilizing Italian leucite as a source of alumina and potash has been realized, and a plant producing 4,000 to 5,000 metric tons of aluminium per year started operations near Civitavecchia in 1931, using the Blanc nitric acid extraction process . . . All the aluminium produced in the United Kingdom is obtained from bauxite, most of which is imported from France."

Table 138.—Imports into Canada and Exports of Aluminium, Alumina, Bauxite, and Cryolite, 1934 and 1935

	1934		1935	
	Cwt.	\$	Cwt.	\$
IMPORTS—				
Alumina.....	1,052	12,235	1,645	16,457
Bauxite.....	1,639,070	2,170,878	2,546,136	2,883,330
Cryolite.....	3,345	27,718	3,436	27,387
Aluminium in pigs, ingots, blocks, notch bars, slabs, billets and blooms.....	796	18,907	1,694	36,954
Aluminium scrap.....	3,520	45,174	5,361	70,045
Aluminium in bars, rods and wire.....	2,480	78,155	1,947	60,331
Aluminium in plates, sheets and strips, including circles.....	12,198	336,469	12,344	356,760
Aluminium pipes and tubes.....	805	38,694	638	31,521
Aluminium leaf, less than .005 mm. thick*.....		2,023		3,133
Aluminium kitchen or household hollow-ware, n.o.p.....		92,411		84,179
Aluminium, manufactures of, n.o.p.....		433,797		468,901
Aluminium leaf, n.o.p., or foil, less than .005 inch thick, plain or embossed.....		53,470		62,908
Aluminium powder.....lb.	109,673	48,137	67,419	30,025
Other.....		4,360		7,597
Total Aluminium and its Products.....		3,362,428		4,139,528
EXPORTS—				
Aluminium scrap.....	27,969	354,617	26,130	348,623
Aluminium in bars, blocks, etc.—				
To United Kingdom.....	264,946	4,566,765	337,204	5,868,348
United States.....	30,499	502,995	50,101	747,978
Argentina.....	284	6,517	53	1,498
Brazil.....	344	7,294	733	15,396
China.....	72	2,611	7,801	131,687
Australia.....	3,055	72,991	10,527	227,566
Japan.....	74,940	1,233,867	121,656	1,922,774
Netherlands.....	22,669	375,383		
British India.....	17,808	375,356	3,234	63,041
Belgium.....	632	13,594	5,845	88,527
Mexico.....	474	10,711	1,096	24,605
Switzerland.....			47,728	744,331
Other countries.....	1,747	38,457	13,604	185,587
Total in bars, blocks, etc.....	417,470	7,206,541	599,582	10,021,338
Aluminium kitchen utensils and hollow-ware.....		11,920		13,219
Aluminium, manufacture of, n.o.p.....		434,564		377,512
Total Aluminium and its Products.....		8,007,642		10,760,692

*From April 15, 1934.

DOMINION BUREAU OF STATISTICS

Table 139.—Estimated World Production of Aluminium, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935
BRITISH EMPIRE			
United Kingdom.....	10,800	12,700	14,900
Canada.....	15,900	15,500	21,100
Total.....	26,700	28,200	36,000
FOREIGN COUNTRIES			
Austria.....	2,100	2,000	2,200
Hungary.....			300
Belgium.....		100	(a)
France.....	14,087	14,835	21,659
Germany.....	18,650	(c) 36,596	(c) 69,661
Italy (c).....	11,880	12,643	14,871
Norway (c).....	15,141	15,104	14,750
U.S.S.R. (Russia).....	4,364	14,164	25,100
Spain.....	(c) 1,136	(c) 1,211	1,200
Switzerland.....	7,400	8,000	11,600
United States (b) (c).....	38,003	33,115	53,257
Sweden (c).....	9	292	1,806
Japan.....		700	3,950
Total.....	113,000	139,000	219,000
World's Total.....	140,000	167,000	255,000

(a) Information not available.

(b) Secondary metal was recovered as follows:—

1933.....	29,900	long tons
1934.....	41,400	
1935.....	45,900	"

(c) Official figures.

Table 140.—World Production of Bauxite, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
Northern Ireland.....	698	57		Greece.....			9,339
British Guiana (c).....				Hungary.....	71,281	182,069	207,745
60% or over alumina.....	32,441	50,998	107,785	Italy.....	93,320	129,193	167,378
50-60% alumina.....	716	2,225	3,414	Yugoslavia.....	85,274	83,489	212,694
30 to 50% alumina (b).....	8,173	11,666	26,410	Roumania.....	1,138	1,435	1,450
India.....	1,075	18	7,635	Spain.....	2,500		(a)
Australia.....	670	1,113	1,156	U.S.S.R. (Russia).....	49,800	(e) 60,000	(e) 130,000
Total.....	44,000	65,000	146,000	United States.....	154,176	157,838	233,912
FOREIGN COUNTRIES—				Dutch Guiana (d).....	104,697	99,412	113,370
France.....	482,750	520,150	504,722	Netherlands East Indies.....			9,766
Germany.....	1,700	6,456	8,412	Total*.....	1,050,000	1,240,000	1,590,000
Mozambique.....			30	World's Total*.....	1,090,000	1,310,000	1,740,000

*Excluding the production in Austria, statistics of which are not available.

(a) Information not available.

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows:—

	1933	1934	1935
Metallurgical.....	10,273	20,406	73,178
Chemical.....	25,095	28,181	37,562
Refractory.....	716	1,775	3,414

(d) Exports.

(e) Estimated.

Table 141.—Production (Exports) of Cryolite from Greenland, 1931-1935

Long tons

1931.....	17,427
1932.....	17,592
1933.....	10,187
1934.....	14,999
1935.....	23,104

NOTE.—It was reported in 1935 that the manufacture of synthetic cryolite was well advanced in Germany.

ANTIMONY

No commercial production of metallic antimony has occurred in Canada since 1917 and no by-product output of the metal since 1926 in which year it was reported as being contained in silver-lead-bismuth bullion produced from the cobalt-silver ores of Northern Ontario. The greater part of the refined antimony made in Canada was produced at Trail, British Columbia, during the years 1907, 1909, 1915 and 1916 by the Consolidated Mining and Smelting Company of Canada, Limited, the metal being recovered in the treatment of silver-lead ores.

Minerals containing antimony occur in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia, also in the Yukon Territory. No deposits of antimony ores, known as such, have been worked commercially in Canada for many years. China is the principal antimony producing country with approximately 95 per cent of the output coming from Hunan province. It was reported that the Hunan Antimony Syndicate was abolished in December, 1935, and the National Antimony Administration formed in January, 1936, with head office located in Shanghai. The purpose of this new organization is to improve the industry in Hunan, regulate production and collect taxes.

During recent years a large proportion of the world's antimony output has been absorbed in the manufacture of storage batteries and bearing metals; the metal is also employed in the manufacture of pigments, type metal, solder, rubber goods and various other products.

The average price of standard brands of antimony in the New York market was 13·616 cents per pound in 1935, an increase of 53 per cent over the average price for the previous year and the largest yearly average since 1926.

Antimony prices per pound, October, 1936, New York—domestic 12·25 cents; Chinese (duty paid), 12·50 cents, spot.

Table 142.—Production of Antimony in Canada, 1911-1935

Year	Antimony ore		Refined regulus		Antimony in silver-lead-bismuth bullion exported	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1911-1914.....						
1915.....	1,314	81,283	59,440	11,888		
1916.....	885	94,537	107,185	41,823		
1917.....	361	22,000				
1918-1924.....						
1925.....					1,751	206
1926.....					1,596	281
1927-1934.....						
1935.....						

NOTE.—For years 1886 to 1910 see previous reports.

Table 143.—Antimony Used in Specified Canadian Industries, 1934 and 1935

Industry	1934		1935	
	Pounds	\$	Pounds	\$
White metal alloys.....	385,052	32,212	595,733	73,048
Electrical apparatus and supplies.....	193,811	10,624	130,380	15,267

Table 144.—Imports of Antimony and Antimony Products into Canada, 1934 and 1935

	1934		1935	
	Pounds	\$	Pounds	\$
Antimony or regulus of, not ground, pulverized or otherwise treated...	625,432	45,124	926,959	113,072
Antimony oxide and titanium oxide*	983,539	131,005	2,870,491	310,083
Antimony salts—tartar emetic, etc.....	41,926	5,297	48,516	7,907
Antimony salts for dyeing.....	112	43	112	40

*From April 1, 1934. (Including white pigments containing not less than 14 per cent by weight of titanium.)

Table 145.—World Production of Antimony Ore, 1933-1935

(In terms of metal)
(Supplied by *Imperial Institute*)
(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Australia.....	47	9	20	Yugoslavia.....			72
Union of South Africa.....			5	French Indo-China.....			17
India.....			20	Algeria.....	100	650	1,008
FOREIGN COUNTRIES				Morocco (French).....			135
United States (b).....	524	361	39	Morocco (Spanish).....		309	(a)
Czechoslovakia.....	1,341	1,142	2,391	Mexico.....	1,919	2,626	4,498
France.....	379	261	(a)	Peru (exports).....	1,866	1,182	3,348
Greece.....	168	90	40	China.....	13,100	15,200	18,000
Italy.....	358	346	446	Turkey.....	334	33	101
Argentina.....	12			Japan.....	33	27	40
				Korea.....	7		2

(a) Information not available.

(b) Secondary metal was recovered as follows:—

1933.....	6,600 long tons
1934.....	6,700
1935.....	8,600 “ “

BARIUM

The use of barium metal and particularly barium alloys is advancing steadily, according to “The Mineral Industry”. It has been utilized in the vacuum tube industry because of its ability to remove the last traces of gases and to emit electrons easily; for the same purpose various barium alloys have been employed. Nickel-barium and nickel-copper-barium alloys are used for spark plugs owing to the production of a better and steadier spark due to their high thermionic electron emission.

BERYLLIUM

The principal ore of beryllium is the mineral beryl— $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$. There are several known occurrences of this mineral in Canada and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. No Canadian beryl mining operations were reported in either 1934 or 1935.

“Interest in the supply and uses of beryllium has increased materially in recent years, and in 1935 the output appears to have attained larger proportions than ever before. Research continues to disclose new uses for beryllium alloys, but unalloyed the metal has no commercial applications. In the United States beryllium-copper alloys have leading interest; in Germany, considerable progress has been made with nickel-base beryllium alloys. Close co-operation is maintained between the American producers of beryllium master alloys and leading German interests. Uncertainty as to the probable magnitude of raw material supplies has tended to retard development of the beryllium industry. Offerings of beryl, however, continue to be encouraging, the supplies coming to a considerable extent from British India in 1935, although Brazil, Argentina, and South Africa also seem to be important, and United States contributions appear likely to be susceptible of large increase. Italian interests are said to be contemplating developing African ores as well as utilizing home supplies, which are probably meagre. Madagascar exported 132 metric tons during the first nine months of 1935 compared with 164 tons during the corresponding period of 1934. Statistics from other countries are not now available. Beryl was quoted at \$30 to \$35 per short ton, f.o.b. mine throughout 1935. The German price for minimum 98 per cent metal remained at 600 marks per kilo until September, when the quotation was reduced to 500 marks.

“Interesting new uses reported during the year include the application of cast beryllium copper to moulds for the manufacture of plastics. It is stated that under favourable conditions this innovation may provide a satisfactory and sometimes cheaper substitute for steel dies and that cast-beryllium copper containing 2.75 per cent beryllium also may be employed for metal-forming dies. Uses for beryllium in the field of light metal alloys and as a tarnish-resistant addition of silver alloys are still in the experimental stage.” (Minerals Year Book, 1936—United States Bureau of Mines.)

“Metal and Mineral Markets”, New York—quotations (October, 1936) for beryllium ore—per ton, carload lots, minimum 10 per cent BeO , \$30; minimum 12 per cent, \$35, f.o.b. mines.

BISMUTH

Production of bismuth in Canada during 1935 totalled 13,797 pounds valued at \$13,245 as compared with 253,644 pounds at \$301,215 in 1934. Of the quantity produced in 1935, British Columbia contributed 6,718 pounds and Ontario the balance. Production of the metal increased greatly in 1936 when the output during the first six months of the year totalled 146,170 pounds. Bismuth produced in the Dominion chiefly represents the metal made in the Trail (British Columbia) metallurgical plants of the Consolidated Mining and Smelting Company of Canada, Limited, together with minor quantities contained in silver-lead-bismuth bullion made and exported by the Deloro Smelting and Refining Co. Ltd., Deloro, Ontario.

For many years the metal was employed almost exclusively for medicinal and pharmaceutical purposes, recently, however, its use in industry has been increasing; it is now utilized in the manufacture of low melting alloys such as sprinkler nozzles, and the element in the form of bismuth perchlorate, in solution, is suitable for electrodeposition. The metal was quoted in October, 1936, at \$1 per pound, ton lots, New York; London 4s.

Table 146.—Production of Bismuth in Canada, 1926-1935

Year	Pounds	\$	Year	Pounds	\$
1926.....	6,440	6,440	1931.....	118,207	157,650 **
1927.....	2,072	1,033	1932.....	16,855	7,340
1928.....	14,002	5,067	1933.....	78,303	81,526
1929.....	194,329	307,114	1934.....	253,644	301,215
1930.....	12,732	6,366	1935.....	13,797	13,245

Table 147.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1934 and 1935

Item	1934		1935	
	Pounds	\$	Pounds	\$
Bismuth metal.....	31,365	31,500	34,276	26,170
Bismuth salts.....	11,554	18,735	10,927	18,027

Table 148.—World Production of Bismuth, Ore, etc.,* 1933-1935

(Supplied by *Imperial Institute*)

(Cwt. = 112 pounds)

Producing country and description	1933	1934	1935
BRITISH EMPIRE			
Union of South Africa—ore (<i>Bi Content</i>).....			4
Canada—metal and content of bullion.....	699	2,265	123
India—(ore).....	80 lb.		2
Australia—(ore, etc.).....	53	297	470
FOREIGN COUNTRIES			
Germany (Saxony)—ore (<i>Bi Content</i>).....		(a)	80
Spain—(ore).....	1,516	3,543	(a)
(metal).....	512	905	(a)
Mexico—ore (<i>Bi Content</i>).....	923	2,033	4,204
Bolivia (exports)—ore, etc. (<i>Bi Content</i>).....	37	993	412
Peru—Lead—Silver bullion, etc. (<i>Bi Content</i>).....	1,607	2,358	193
Metal.....	4,149	3,014	2,967
China—(ore, <i>Bi-Content</i>).....	350	570	(a)
Japan—(metal).....	1,124	991	1,060
Norway—copper ore (<i>Bi-Content</i>).....			16
Argentina—ore.....		180	1,300
Roumania—ore.....			280

*Bismuth is also recovered as a by-product in the United States, United Kingdom, France, Sweden and U.S.S.R. (Russia).

(a) Information not available.

CADMIUM

Cadmium production in Canada represents the recovery of the metal as a by-product in the electrolytic refining of zinc. Production up to 1936 came entirely from the treatment of zinc-bearing ores at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. The quantity of the metal produced in Canada during 1935 totalled 580,530 pounds valued at \$441,203 and represented recoveries solely from British Columbia ores. It is interesting, however, to note that the Hudson Bay Mining and Smelting Company commenced the commercial production of cadmium at Flin Flon, Manitoba, for the first time, during the early part of 1936.

The use of cadmium as a substitute for tin in bearing metals is now attracting considerable attention; cadmium-silver-copper, cadmium-silver and copper-lead-cadmium alloys are now being employed by the automobile industry. Previous to the adaption of cadmium as an alloy metal relatively large quantities were employed for the rustproofing of small automobile parts and it is reported that its use as a substitute for zinc, nickel or copper plating continues to develop. It is also stated that the use of cadmium-copper alloy for tramway and railway trolley wires is also increasing, and the use of the alloy is being extended for overhead telephone and telegraph lines, for flexible telephone cords and similar cables. A copper-cadmium alloy, containing from 0.8 per cent to 1.0 per cent cadmium, is being introduced for long span, high voltage, transmission lines. The metal also finds growing application in the form of sulphide or sulpho-selenide as a pigment for the enamel, ceramic, rubber and paint industries.

Cadmium quotations, October, 1936, New York, per pound to platers, patented shapes, \$1.05. On quantity business, commercial sticks, prompt and forward shipment, quotations range from 75 cents to \$1. London, 2s. 11d. to 3s.

Table 149.—Cadmium Production* in Canada, 1928-1935

Year	Pounds	\$
1928.....	491,894	341,374
1929.....	773,976	675,294
1930.....	456,582	337,871
1931.....	323,139	180,958
1932.....	65,425	26,824
1933.....	246,041	78,733
1934.....	293,611	95,665
1935.....	580,530	441,203

*Produced in British Columbia. In addition cadmium precipitate was produced and stored by the Hudson Bay Mining and Smelting Co., Ltd., at Flin Flon, Manitoba.

In 1935 there was 72,104 pounds of cadmium valued at \$60,716 used in the Canadian white metal alloys industry.

Table 150.—World Production of Cadmium, 1933-1935

(Supplied by Imperial Institute)
(Lb. avdp.)

Producing country	1933	1934	1935
BRITISH EMPIRE			
Canada.....	(c) 246,041	(c) 293,611	580,530
Australia.....	357,313	380,493	459,666
South West Africa (d).....		140,000	320,000
FOREIGN COUNTRIES			
Belgium.....	355,000	498,245	332,903
France.....	88,000		266,754
Italy.....	15,287	17,600	35,300
United States—			
Metal.....	2,276,933	2,777,384	3,477,091
Compounds (metal content).....	401,400	566,700	507,400
Mexico (b).....	1,107,073	848,149	1,317,321
U.S.S.R. (Russia).....	(a)	5,700	26,400
Norway.....	308,000	302,030	260,143
Poland.....	114,000	316,486	248,458

Cadmium is also produced in Germany, Sweden and Japan.

(a) Information not available.

(b) Including cadmium content of flue dust, etc., exported for treatment.

(c) Excluding cadmium precipitate produced at Flin Flon, Manitoba.

(d) Cadmium content of shipments of dust from the smelters to Germany.

CAESIUM

Caesium is not produced in Canada; the metal belongs to the alkali group, but differs from potassium and sodium in the properties of its complex salts, many of which are comparatively insoluble in water. In nature, caesium is relatively rare; it occurs in the mineral Pollux or Pollucite, which is a hydrated aluminium caesium sodium silicate containing from 30 to 36 per cent caesium oxide. This is found in Hebron, Maine (U.S.A.) and in Germany. Caesium is recovered from its mineral by treatment with hydrofluoric acid and then precipitated out of solution by the addition of antimony trichloride. Practically all of the caesium produced today is consumed in the production of photoelectric cells. The modern caesium cell has an average sensitivity of 60 microamperes per lumen. Caesium also occurs in some of the lepidolites and in some of the carnallites. (The Chemical Trade Journal and Chemical Engineer, London.)

There is no record of any imports into Canada of caesium during recent years.

CALCIUM

Metallic calcium, produced by the electrolysis of the fused chloride, is gradually acquiring new commercial applications. Among the more important of these are the debismuthizing of lead (the Betterton process); the hardening of lead for various purposes, particularly bearing metals and cable coverings; as a deoxidizer for copper and its alloys, and for cast iron and steel; as a constituent of aluminium alloys for forging and casting; as a reducing agent for oxides of beryllium, chromium, thorium and uranium; as a desulphurizing agent in petroleum refining; and as an absorbent of residual gases in vacuum tubes.* The metal has not yet been produced in Canada.

CHROMITE

Chromite production in Canada during 1935 was valued at \$14,947 as compared with \$1,578 in 1934. The output of the mineral during both years came from the Coleraine area in the eastern Townships of Quebec and the Obonga lake deposits of northwestern Ontario. The Chromium Mining and Smelting Corporation Ltd., conducting mining operations at Obonga lake, commenced the production of ferrochrome at Sault Ste. Marie, Ontario, in August, 1935, utilizing chromite shipped from its Obonga lake mine. Early in 1936 it was announced that the smelting plant was to be enlarged and a 100 ton concentrator built at the mine.

"The continued improvement in the international ferrous-metallurgical industries, coupled with armament activities by the military powers during 1935, increased the demand for chromite. World production in 1935 exceeded 1934 and probably was greater than in 1929, although complete figures are not available. Production in Turkey continued to expand in 1935 and reached a new high of 150,504 metric tons. The U.S.S.R. (Russia) was probably the leading producer; an output of 180,000 tons was planned for 1935. Southern Rhodesia ranked third in 1935 but was closely followed by the Union of South Africa, where output increased 47 per cent over 1934. The improvement in the consumption of chromite during the last year reflects the increased activity in the steel industry, the principal consumer. The automobile industry in the United States, one of the principal users of chromium-alloy steels and chromium plating, increased its output 43 per cent over 1934, making 3,946,934 cars in 1935. The building-construction industry uses stainless steel for decorative purposes and large quantities of chromium-plated plumbing fixtures. Chromium in varying quantities, either alone or combined with other alloying elements, enters into the manufacture of a wide variety of alloy steels designed for specific purposes. Perhaps the most widely known are the steels and irons of the chromium and chromium-nickel series, which are extensively used in the automobile, building, dairy, paper, petroleum and chemical industries, as well as in kitchen equipment for restaurants, hotels and hospitals. Chromium plating may be divided into two classes—decorative and wear-resisting. The former is encountered more commonly, being used extensively in automobile fittings and hardware, plumbing fixtures and miscellaneous hardware and cutlery; wear-resisting plate, while not as well known as decorative plate, has many important industrial applications, including use for dies, rolls, and engraving plates. The second largest use of chromite, in the United States, is in the manufacture of refractory materials, such as brick, cement, ground ore or crude lump ore; the ore used for this purpose is imported largely from Cuba, Greece and the Union of South Africa. Chrome refractories are neutral metallurgically and quite resistant to many types of slag." (Minerals Year Book, 1936—United States Bureau of Mines.)

* The Mineral Industry.

Of the 73,971 metric tons of chromite exported from New Caledonia in 1935 the United States took 61,238 tons; the Netherlands, 4,674 tons; Germany, 2,540 tons; Japan, 1,612 tons, and Australia 1,547 tons.

Table 151.—Consumption of Certain Chromium Products in Specified Canadian Industries, 1934 and 1935

Industry	Item	1934		1935	
		Pounds	\$	Pounds	\$
Paints, pigments and varnishes.....	Chrome colours.....	1,008,063	147,598	1,141,200	175,401
Paints, pigments and varnishes.....	Sodium bichromate...	434,786	33,205	475,121	36,602
Chemicals.....	Sodium bichromate.....	23,266	1,783	18,074	1,514
Leather tanning.....	Sodium bichromate...	1,230,073	90,116	1,550,165	115,393

NOTE.—In addition to the items listed above, a considerable quantity of ferrochrome is utilized in the manufacture of Canadian alloy steels.

Table 152.—Production of Chromite in Canada, 1925-1935

Year	Short tons	Value
1925-1928.....		\$
1929.....	126	900
1930.....		
1931.....		
1932.....	78	1,113
1933.....	30	343
1934.....	111	1,578
1935.....	1,144	14,947

NOTE.—For the years 1886 to 1924, see previous reports.

Table 153.—Imports of Chromium and Chromium Products into Canada, 1934 and 1935

	1934		1935	
	Quantity	\$	Quantity	\$
Chromium metal and tungsten metal, in lumps, etc., when imported by manufacturers for alloying purposes..... lb.	26,222	16,461	36,007	22,454
Nickel chromium in bars or rods not more than 0.75 inch diam., containing 60% nickel and 10% chromium, for use as electric resistance wire, etc..... lb.	48,413	45,114	43,434	41,381
Chrome firebrick..... lb.		39,184		46,882
Bichromate of potash—crude..... lb.	139,865	11,684	151,336	12,150
Bichromate of soda..... lb.	2,374,311	138,313	2,634,271	148,421

Table 154.—World Production of Chrome Ore, 1933-1935

(Supplied by *Imperial Institute*)
(Long tons)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Southern Rhodesia.....	34,493	70,961	104,240	Cuba.....	21,837	57,325	47,743
Union of South Africa.....	33,541	60,388	89,003	United States.....	966	341	440
Cyprus.....		966	1,179	Roumania.....	29		
Canada.....	27	99	1,022	Japan.....	19,681	26,792	35,736
India.....	15,526	21,576	39,127	Turkey.....	74,188	117,951	148,096
Australia.....	891	1,716	595	New Caledonia.....	49,100	54,300	54,430
Total.....	84,000	156,000	235,000	Guatemala (b).....	2,061	792	
FOREIGN COUNTRIES				Bulgaria.....	167	84	320
Greece.....	14,550	30,209	(c) 29,309	Phillipine Islands (c).....			1,272
Yugoslavia.....	25,062	46,604	59,453	Total.....	319,000	462,000	(a)
Norway.....	321	41		World's Total.....	403,000	618,000	(a)
U.S.S.R. (Russia).....	110,948	127,159	(a)				

(a) Information not available.

(b) Imports into the United States from the country indicated.

(c) Exports.

COLUMBIUM

This element has not been recovered or produced commercially in Canada. The mineral columbite, however, has been reported as occurring in Renfrew county, Ontario.

"The discovery that a small percentage of columbium in stainless steels would prevent intergranular corrosion at elevated temperatures has led to the first real commercial demand for this metal. The chief source is columbite, which is recovered in small quantities from tin ores in Nigeria. Exports of 403 tons of columbite from Nigeria to the United States were made in 1935, according to a U.S. Consular report. The ore is purified and converted into a ferro-alloy carrying 50-60 per cent Cb, which sells for \$2.50 per pound of contained Cb". (The Mineral Industry, 1935.)

"Metal and Mineral Markets", New York—quotations for columbium, October, 1936, were—per kilo, base prices: rod, \$560; sheet, \$500.

No imports of the metal or its ores into Canada were recorded in 1935.

IRON ORE

No iron ores, known as such, are mined at present in Canada. Nova Scotia with its large iron and steel industry is not a producer of iron ore. The large deposits of high grade ore in Newfoundland, owned and operated by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia.

In northwestern Ontario, about 1899, a deposit of hematite, that later developed into the Helen mine, was found. This proved the chief source of Ontario's iron output for a number of years. The high grade ore was exhausted and the mine is now idle; Ontario has a considerable supply of low grade iron ore that would require beneficiation for commercial use. Iron ores, chiefly low in grade, also occur in British Columbia, Ungava and other parts of the Dominion.

Imports of iron ore into Canada during 1935 totalled 1,509,933 tons valued at \$2,960,207 and of this tonnage 762,146 came from the United States, 693,375 from Newfoundland and 29,530 from Norway. Imports in 1934 totalled 977,341 tons worth \$1,827,308.

Table 155.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1926-1935

(For years 1895 to 1925 see Mineral Production of Canada, 1928)

Year	To Nova Scotia	To United States	To Europe	Total shipments
	Short tons	Short tons	Short tons	Short tons
1926.....	465,961	.....	503,640	969,601
1927.....	480,757	68,354	946,569	1,495,680
1928.....	690,316	41,493	1,001,833	1,733,642
1929.....	763,168	85,501	850,370	1,699,039
1930*.....	523,918	54,623	740,774	1,319,315
1931.....	234,148	25,670	530,079	789,897
1932*.....	.....	.....	166,303	166,303
1933.....	.....	.....	254,383	254,383
1934*.....	346,178	.....	344,769	690,947
1935.....	611,581	.....	81,123	692,704

* European shipments in 1930, 1932 and 1934 were to Germany only, while in 1935 shipments went to both Germany and Great Britain.

Table 156.—Imports into Canada, and Exports of Iron Ore, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
	Short tons	\$	Short tons	\$
IMPORTS—				
Iron ore from United States.....	684,581	1,257,745	762,146	1,561,935
Iron ore from French Africa.....	.....	.....	.....	.....
Iron ore from other countries*.....	292,760	569,563	747,787	1,398,272
Total.....	977,341	1,827,308	1,509,933	2,960,207
EXPORTS—Total.....	3,311	12,383	2,746	9,826

* In 1934, 265,661 tons at \$473,161 were imported from Newfoundland, and in 1935—693,375 tons worth \$1,236,898 were imported.

Table 157.—World Production of Iron Ore

(Supplied by Imperial Institute, London)

(Including Manganiferous iron ore)

(Long tons)

Producing Country	Ore			Estimated Iron Content		
	1933	1934	1935	1933	1934	1935
BRITISH EMPIRE						
United Kingdom (c).....	7,461,720	10,586,846	10,895,385	2,238,516	3,176,054	3,268,616
Sierra Leone (exports).....	24,550	210,645	433,540	14,000	120,100	247,100
Union of South Africa.....	67,496	229,494	299,247	24,609	141,391	188,615
Newfoundland.....	320,891	506,616	662,441	167,000	263,000	344,000
India.....	1,228,625	1,916,918	2,364,297	790,000	1,230,000	1,510,000
Unfederated Malay States.....	766,527	1,135,649	1,411,636	490,000	730,000	900,000
Australia.....	736,604	1,263,708	1,874,418	482,000	823,000	1,237,000
New Zealand.....	6,572	2,806	10,646	3,600	1,300	4,900
Total.....	10,600,000	15,800,000	17,950,000			
FOREIGN COUNTRIES						
Austria.....	262,814	459,462	763,175	92,554	160,687	264,997
Belgium.....	104,523	114,060	161,920	47,000	51,000	(a)
Czechoslovakia.....	422,000	530,233	719,512	136,965	174,265	237,693
France.....	29,767,145	31,509,515	31,821,597	10,000,000	11,000,000	11,000,000
Germany.....	2,550,513	4,274,092	5,947,855	815,316	1,350,639	1,819,361
Greece.....	83,875	145,080	200,922	38,063	61,627	(a)
Hungary.....	49,231	67,775	189,357	17,942	24,496	63,466
Italy.....	517,294	494,153	559,771	259,355	247,000	280,000
Luxemburg.....	3,309,312	3,773,297	4,068,520	1,019,480	1,155,197	1,248,689
Norway.....	466,379	558,452	753,067	304,476	362,562	489,443
Poland.....	270,161	243,458	327,059	84,000	77,000	103,000
Portugal.....	4,400	2,849	866	2,100	1,300	400
Roumania.....	13,613	82,270	91,932	6,058	38,854	41,000
Spain.....	1,786,811	2,060,929	2,591,570	830,000	970,000	1,220,000
Sweden.....	2,656,127	5,170,093	7,807,566	1,659,000	3,200,000	4,783,000
Switzerland.....	(d)	(d)	3,800	(a)	(a)	(a)
U.S.S.R. (Russia).....	14,294,000	21,289,000	26,635,000	(a)	(a)	(a)
Yugoslavia.....	50,925	177,002	231,022	26,685	89,000	116,000
Algeria.....	749,426	1,305,488	1,648,180	375,000	691,900	873,500
Belgian Congo.....	69	(a)	(a)	(a)	(a)	(a)
Egypt.....		200	15		90	7
Morocco (Spanish).....	507,692	811,785	1,149,165	279,000	447,000	632,000
Tunis.....	286,000	537,900	495,000	148,000	277,000	257,000
Cuba.....	275,197	96,500	(a)	126,600	44,400	(a)
Mexico.....	76,486	104,128	(a)	48,950	66,648	60,257
United States (b).....	17,744,819	24,809,438	31,008,184	8,800,000	12,400,000	15,500,000
Brazil (estimated).....	30,000	30,000	30,000	20,000	20,000	20,000
Chile.....	556,246	957,800	835,987	344,316	575,215	500,000
China.....	1,118,500	1,338,100	(a)	450,000	550,000	(a)
French Indo-China.....	405	1,512	620	222	692	276
Japan.....	315,605	424,863	507,718			(a)
Korea.....	514,000	561,454	588,663	230,000	310,000	330,000
"Manchoukuo".....	1,158,060	1,115,471	1,454,598	580,000	550,000	(a)
Bulgaria.....			2,333			1,516
Philippine Islands (exports).....		7,125	278,836		(a)	(a)
Total.....	80,000,000	103,000,000	120,000,000			
World's Total.....	91,000,000	119,000,000	138,000,000			

(a) Information not available.

(b) Including shipments of manganiferous iron ore up to 35 per cent Mn.

(c) In addition, bog ore and iron ore (not used for smelting) were produced as follows:—

1933.....	8,256 long tons
1934.....	9,709 "
1935.....	7,986 "

(d) Production for last decade varied between 25,000 and 70,000 tons, except in 1935 when production was 3,800 tons.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Statistics for the primary iron and steel industry cover the operations of plants engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and direct steel castings, (d) rolled and drawn iron and steel products such as bars, plates, sheets, strips, rails, wire rods, structural shapes, etc. Thirty-eight firms were included in this industry in 1935 and reports were received for 53 different plants or departments including 4 blast furnace departments, 3 ferro-alloy plants, 30 steel furnace divisions and 16 rolling or drawing mills.

Factory sales of pig iron, steel, ferro-alloys and rolled products were nearly 33 per cent higher in 1935 than in 1934, the values being \$38,700,961 and \$29,101,463 respectively. The 24 works in Ontario reported sales at \$25,268,288 or 65 per cent of the total for Canada; 6 works in Nova Scotia accounted for \$7,987,949 or 20 per cent, and 13 plants in Quebec had total sales worth \$4,155,782 or 11 per cent of the total. There were also 4 operating plants in Manitoba, 1 in Alberta and 5 in British Columbia.

Capital employed in 1935 was reported at \$86,465,290, of which \$63,011,795 represented the value of land, buildings and plant equipment, \$16,141,507 was the value placed on materials on hand and in process, and finished products on hand, and \$7,312,188 was the total of operating capital such as cash, bills receivable, etc., as at the end of the year. The total for Ontario was \$53,889,173; for Nova Scotia, \$19,233,969; for Quebec, \$11,262,923; for Manitoba, \$1,723,715; and for Alberta and British Columbia, \$355,710.

The average number of employees in the primary iron and steel plants was 9,523 in 1935, compared with 7,400 in 1934. About 680 workers were employed in blast furnace departments, 293 in ferro-alloy plants, 3,150 on steel furnaces, and 5,400 in rolling mills. About 61 per cent, or 5,882 of these workers were employed in Ontario, 1,791 in Quebec, 1,630 in Nova Scotia, 304 in Manitoba and 116 in Alberta and British Columbia.

Payments in salaries and wages amounted to \$12,279,390 in 1935, an increase of 36 per cent over the total of \$9,009,512 for 1934. The average wage per wage-earner was \$1,246 in 1935 compared with \$1,136 in 1934.

Expenditures for fuel and electricity totalled \$4,845,559 in 1935 compared with \$3,969,136 in the previous year. Electricity alone cost \$1,542,399 in 1935 and \$1,148,554 in 1934.

(a) **Pig Iron.**—Production of pig iron increased by 48 per cent in 1935 to 599,875 long tons as compared with 404,995 in 1934 and 227,317 tons in 1933. Output of basic iron was given at 468,244 or 78 per cent of the total; malleable iron amounted to 69,337 tons and the foundry grade to 62,294 tons.

Sales of pig iron by the producers totalled 131,749 tons at \$2,650,990 in 1935 as against 97,440 tons at \$1,856,284 in the previous year. Transfers of pig iron to the other departments of the producing companies amounted to 445,165 tons or 26 per cent more than in 1934.

Imports of pig iron during 1935 advanced to 8,920 long tons from 6,419 tons in 1934 and exports advanced to 13,759 tons from 9,221 tons. Stocks held by the producers advanced to 87,346 tons at the end of 1935 from 65,637 tons at the close of 1934. The apparent consumption of pig iron during the year, as computed from production, imports and changes in stocks, amounted to 573,327 tons compared with 446,063 tons during 1934.

Charges to furnaces in 1935 included 1,039,234 long tons of iron ore, 55,269 long tons of mill cinder, etc., 30,714 long tons of scrap, 577,355 short tons of coke, and 278,469 short tons of limestone.

The four producers of pig iron in Canada have 10 blast furnaces available for use which, if operated at capacity, could produce 1.43 million tons of pig iron per year. Actual production in 1935 at 599,875 tons was about 42 per cent of the rated capacity.

Iron furnaces in blast in January represented 34 per cent of the capacity; this percentage advanced to 37 for the months February, March, April and May; increased again to 45 for the period June to October, inclusive. In November the year's high of 52 was reached, and in December, the percentage dropped to 45 again.

Only 5 of the 10 furnaces were used during the year.

(b) **Ferro-Alloys.**—Production of ferro-alloys during 1935 amounted to 56,616 long tons compared with 31,921 tons in 1934 and 30,133 tons in 1933.

In 1935, ferrosilicon was produced by 6 different plants. Four concerns recovered small tonnages of ferrosilicon as a by-product from the manufacture of fused alumina, another company made 50 per cent, 75 per cent and 90 per cent grades of ferrosilicon and a little ferrochrome, and another concern made 15 per cent, 50 per cent, 75 per cent, 85 per cent and 90 per cent grades of ferrosilicon, some ferrochrome, and large tonnages of ferromanganese and spiegeleisen. One of the pig iron producers made occasional runs of spiegeleisen in their blast furnace, and a chemical manufacturer made some ferrophosphorus.

Imports of ferro-alloys totalled 2,154 long tons at \$273,146 in 1935 as against 1,226 tons at \$247,783 in 1934.

(c) **Steel Ingots and Castings.**—Steel production advanced 24 per cent in 1935 to 941,527 long tons from 757,782 tons in 1934. The 1935 output included 909,186 tons of ingots and 32,341 tons of castings. Practically all of the ingots were transferred to the producers' own rolling mills, while nearly all of the castings were made for sale. The sales of ingots and castings amounted to 35,392 tons at \$4,196,922 compared with 20,139 tons at \$3,228,451 in the previous year. Transfers to the producers' own works were reported at 912,075 tons as against 737,477 tons in 1934.

Inventories of steel on December 31, 1935, were reported at 20,964 tons of ingots and 2,390 tons of castings, a total of 23,354 tons.

Thirty steel plants were in operation during 1935. Four of these works operated basic open hearth furnaces only, 22 used electric furnaces only, 2 used both basic open hearth and electric furnaces and 2 used only converters. Six plants made basic open hearth steel ingots, 5 made electric ingots, 21 made electric steel castings, 3 made basic open hearth castings and 2 made converter castings. These plants reported steel furnace equipment as follows: 42 basic open hearth furnaces with a total daily capacity of 5,186 long tons; 4 converters with total capacity of 932 tons, and 37 electric furnaces with a total capacity of 758 tons. Two plants were idle during the year, 1 electric furnace in Ontario and 1 basic open hearth furnace in Alberta, with a combined capacity of about 87 tons of steel per day.

(d) **Rolled and Drawn Steel.**—In 1935 there were 13 hot rolling mills in operation, 1 cold rolling plant and 2 works for making cold drawn shapes. Nine of these mills were in Ontario, 3 in Quebec, 3 in Nova Scotia, and 1 in Manitoba.

The value of sales from these rolling mills was reported at \$29,980,003, an increase of 30 per cent over the corresponding total of \$23,035,746 for 1934. Merchant bars were worth \$7,195,199; plates, sheets, strips and sheet piling, \$6,124,505; rails, \$4,484,594; blooms, billets and slabs, \$1,899,030; cold rolled and cold drawn shapes, \$1,402,950; bars for reinforcing concrete, \$1,597,280; structural shapes, \$1,762,205; wire rods, \$2,412,244; and railway tie plates, \$944,342. Horseshoes, railway spikes, forgings and miscellaneous rolled products made up the remainder of the output.

About 1,031,000 long tons of iron and steel passed through the mills in 1935 and 950,000 tons of this came from the producers' own works.

Imports of rolling mill products were valued at \$24,573,577 in 1935 compared with \$20,801,030 in 1934. Shipments from the United Kingdom were worth \$12,102,715 and the purchases from the United States were appraised at \$11,538,552.

Table 158.—Principal Statistics of the Primary Iron and Steel Industry, 1929-1935

Years	No. of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	* Cost of materials at works	Selling* value of products at works
		\$		\$	\$	\$	\$
1929.....	45	109,446,529	11,218	18,534,681	6,691,961	32,514,596	72,231,995
1930.....	49	112,079,926	9,723	14,934,325	5,182,136	22,765,648	52,588,935
1931.....	53	104,512,104	8,026	11,072,054	3,757,243	15,291,414	36,911,245
1932.....	52	96,323,629	4,847	6,131,057	2,367,122	6,289,483	16,197,526
1933.....	50	96,444,846	5,200	6,049,189	2,699,837	7,598,931	18,492,549
1934.....	51	90,079,004	7,400	9,009,512	3,969,136	12,673,398	29,101,463
1935							
Nova Scotia.....	6	19,233,969	1,630	2,161,043	1,186,315	4,461,459	7,987,949
Quebec.....	13	11,262,923	1,791	1,673,754	516,560	1,552,773	4,155,782
Ontario.....	24	53,889,173	5,682	7,948,325	2,967,598	12,175,025	25,268,288
Manitoba.....	4	1,723,715	304	375,631	147,175	268,644	1,040,316
Alberta.....	1	355,710	116	120,637	27,911	61,171	248,626
British Columbia.....	5						
Canada.....	53	86,465,490	9,523	12,279,390	4,845,559	18,539,072	38,700,961

*Figures of materials used are of purchased materials only, and production figures cover sales only.

Table 159.—Production of Pig Iron and Sales by the Producers, 1934 and 1935

Grades	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Selling value at works
1934	Long tons	Long tons	Long tons	\$
Basic.....	310,631	347,109	8,898	176,271
Foundry.....	50,923	1,596	54,422	1,023,474
Malleable.....	43,441	2,201	34,120	656,539
Total.....	404,995	350,906	97,440	1,856,284
1935				
Basic.....	468,244	431,435	15,968	332,658
Foundry.....	62,294	4,016	60,414	1,212,396
Malleable.....	69,337	9,714	55,367	1,105,936
Total.....	599,875	445,165	131,749	2,650,990

Table 160.—Consumption of Pig Iron in Canada, by Industries and by Provinces, 1929-1934

	1929	1930	1931	1932	1933	1934
	Long tons	Long tons	Long tons	Long tons	Long tons	Long tons
(a) BY INDUSTRIES						
Steel ingots and castings.....	761,878	520,562	328,063	106,951	156,962	352,346
Castings and forgings.....	200,323	149,012	114,670	55,429	37,300	52,938
Boilers, tanks and engines.....	1,492	1,404	657	744	3,156	6,579
Agricultural implements.....	48,821	26,589	11,704	4,427	4,974	6,750
Machinery.....	32,483	24,836	8,837	4,913	4,091	6,608
Automobiles.....						
Automobile parts.....	3,823	2,718	35	1,823	2,000	4,105
Railway rolling stock.....	32,932	23,601	14,433	6,855	7,653	13,530
Brass and copper.....						917
Sheet metal products.....	11,480	272	6			
Hardware and tools.....	2,504	1,713	1,130	908	872	1,418
Miscellaneous iron and steel.....	1,013	737	168	272	220	242
Electrical apparatus and supplies.....	4,982	2,862	1,585	546	427	876
Total.....	1,101,731	754,306	481,288	182,868	217,655	446,309
(b) BY PROVINCES						
Prince Edward Island.....	56	60	50	42	30	30
Nova Scotia.....	297,508	213,011	122,152	28,569	85,854	171,680
New Brunswick.....	2,258	1,677	1,287	689	971	1,926
Quebec.....	72,293	56,291	39,661	19,336	11,356	17,733
Ontario.....	712,242	478,284	315,221	132,181	117,934	253,255
Manitoba.....	11,549	2,761	1,415	1,274	822	880
Saskatchewan.....	2,000					
Alberta.....	1,094	187	120	108	73	100
British Columbia.....	2,731	2,035	1,382	669	615	705
Canada.....	1,101,731	754,306	481,288	182,868	217,655	446,309

Table 161.—Materials Charged to Iron Blast Furnaces,* 1934 and 1935

Materials	1934		1935	
	Quantity	Cost at furnace	Quantity	Cost at furnace
		\$		\$
Foreign iron ore..... long tons	718,237	2,513,465	1,039,234	3,528,011
Mill cinder, scale, etc..... long tons	37,043	78,139	55,269	107,687
Scrap (net charge)..... long tons	12,461	108,966	30,714	300,131
Limestone—				
From Canadian quarries..... short tons	69,318	84,675	94,818	117,771
From foreign sources..... short tons	139,786	155,587	183,651	179,853
Coke made in Canada—				
From Canadian coal..... short tons	155,085	879,223	239,312	1,352,244
From imported coal..... short tons	215,462	1,005,930	281,359	1,420,234
Imported coke..... short tons	44,915	285,941	56,684	364,003
Other materials.....		48,233		110,684
Total.....		5,160,159		7,480,618

*For making pig iron.

Table 162.—Imports into Canada and Exports of Pig Iron, 1927-1935

Years	Imports		Exports	
	Long tons	\$	Long tons	\$
1927.....	40,922	781,832	344	7,752
1928.....	43,307	791,733	1,043	20,642
1929.....	32,548	624,891	7,478	151,967
1930.....	13,643	270,157	593	12,653
1931.....	7,912	148,951	2,787	55,183
1932.....	4,753	78,845	2,029	38,816
1933.....	2,459	43,298	11,903	214,195
1934.....	6,419	108,300	9,221	176,093
1935.....	8,920	143,726	13,759	287,396

Table 163.—Blast Furnaces in Canada, 1935

Names of companies	Location of plants	Number of stacks	Total daily capacity (24 hours)	Number of days in blast	
				1934	1935
Dominion Steel and Coal Corporation Ltd...	Sydney, N.S.....	1	350		62
		1	300		
		1	550	262	365
Total.....		3	1,200		
Canadian Furnace Co. Ltd.....	Port Colborne, Ont.....	1	350	205	238
The Steel Co. of Canada, Ltd.....	Hamilton, Ont.....	1	275	44	
		1	550	278	365
Total.....		2	825		
Algoma Steel Corp. Ltd.....	Sault Ste. Marie, Ont...	1	300		
		1	300		
		1	450	203	326
		1	550		
Total.....		4	1,600		
Total for Canada.....		10	3,975		

Table 164.—Production of Ferro-Alloys, 1927-1935

Years	Long tons	Years	Long tons
1927.....	56,230	1932.....	16,161
1928.....	44,842	1933.....	30,133
1929.....	89,116	1934.....	31,921
1930.....	65,223	1935.....	56,616
1931.....	46,764		

Table 165.—Production of Steel Ingots and Direct Steel Castings, by Grades, 1927-1935
(Long tons)

Years	Steel Ingots		Direct steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Convertor	Electric	
1927.....	868,440	134	17,569	2,191	19,611	907,945
1928.....	1,189,399	602	20,109	2,019	22,590	1,234,719
1929.....	1,295,162	14,444	35,806	2,590	30,022	1,378,024
1930.....	925,427	30,051	24,772	2,314	27,014	1,009,578
1931.....	612,437	25,017	14,760	590	19,305	672,109
1932.....	308,700	19,670	2,616	846	7,514	339,346
1933.....	378,666	15,393	5,017	288	10,615	409,979
1934.....	713,227	23,891	6,457	507	13,700	757,782
1935.....	872,444	36,742	9,119	645	22,577	941,527

Table 166.—Materials Used in Steel Furnaces, 1934 and 1935

Materials	1934		1935	
	Quantity	Cost of purchased materials	Quantity	Cost of purchased materials
	Long tons	\$	Long tons	\$
(a) Metals:—				
Pig iron—Own make.....	349,137	.....	441,982	.....
Purchased.....	3,209	65,216	4,289	94,827
Spiegeleisen and ferromanganese.....	6,771	345,683	10,733	449,155
Ferrosilicon.....	2,954	137,743	3,867	185,140
Other ferro-alloys.....	1,087	252,633	.....	283,412
Scrap iron and steel—Own make.....	193,370	.....	290,462	.....
Purchased.....	287,309	3,029,549	430,763	4,454,080
Metals for making alloy steel (nickel, etc.).....	.....	71,141	.....	109,062
Total metals.....	.....	3,901,965	.....	5,575,676
(b) Ores:—				
Crude iron ore—				
Foreign.....	33,739	197,087	49,717	265,439
Calcined, roasted, or treated ore—				
Foreign.....	220	3,644	181	2,473
Manganiferous ore—				
Foreign.....	751	12,235	414	6,632
Chrome, etc.—				
Foreign.....	134	3,892	208	6,269
Total ores.....	34,844	216,858	50,520	280,813
(c) General Materials:—	Short tons		Short tons	
Limestone—				
Canadian.....	31,103	96,454	32,898	52,889
Foreign.....	46,712	51,026	58,514	55,102
Fluorspar.....	4,555	55,643	5,859	73,047
Dolomite.....	14,748	69,104	18,394	79,914
Magnesite.....	2,733	105,072	3,891	149,987
Coke made from Canadian coal.....	472	4,683	863	8,832
Coke made in Canada from imported coal.....	404	1,150	354	1,777
Imported coke.....	1,321	17,541	1,529	18,081
Anthracite coal.....	547	4,801	256	2,106
Bituminous coal.....	100	802	264	2,116
Charcoal.....	80	2,156	159	3,922
Electrodes.....	.....	94,125	.....	144,580
Moulding sands.....	14,199	73,424	20,339	105,592
Firebrick.....	.....	49,386	.....	259,012
Fireclay.....	3,005	26,393	4,345	40,949
Other materials.....	.....	319,296	.....	432,625
Total General Materials.....	.....	971,056	.....	1,430,531
Total value of metals, ores and general materials used.....	.....	5,089,879	.....	7,287,020

Table 167.—Summary of Steel Furnace Capacity in Canada, 1935

Type of furnace	*Number of furnaces	Total daily capacity (24 hours)
		Long tons
Basic open hearth.....	42	5,186
Electric.....	37	758
Converter.....	4	932
Total.....	83	6,876

*Including 2 furnaces (1 electric and 1 B.O.H.) in plants which were idle in 1935.

Table 168.—World Production of Pig Iron and Ferro-Alloys, 1933-1935

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	4,136,000	5,969,100	6,424,100	Hungary.....	91,602	138,005	182,947
Union of S. Africa.....	26,000	(a)	(a)	"Manchoukuo".....	426,578	468,285	598,346
Canada.....	257,450	434,935	656,695	Italy.....	557,966	572,403	692,718
India.....	1,057,837	1,320,210	1,466,044	Yugoslavia.....	29,238	32,097	21,215
Australia (b).....	336,246	487,259	698,493	Luxembourg.....	1,857,727	1,968,603	1,842,800
New Zealand.....	3,286	1,337	4,902	Netherlands.....	248,655	253,769	249,610
Total.....	5,800,000	8,200,000	9,300,000	Norway.....	110,874	124,927	128,686
FOREIGN COUNTRIES				Poland.....	300,956	376,163	387,873
Austria.....	86,560	131,384	190,119	Roumania.....	1,981	60,662	80,694
Belgium.....	2,667,623	2,905,889	2,981,752	U.S.S.R. (Russia).....	7,015,000	10,263,600	12,309,000
China.....	170,537	153,182	(a)	Spain.....	333,501	366,465	349,172
Czechoslovakia.....	491,099	590,843	798,130	Sweden.....	340,069	548,422	602,001
Finland.....	11,814	7,457	(a)	Mexico.....	52,655	65,408	63,126
France—				United States.....	13,345,602	16,138,573	21,372,699
Saar.....	1,566,586	1,796,831	(c) 297,422	Brazil.....	46,035	57,635	54,200
Other districts.....	6,258,952	6,045,129	5,697,745	Japan.....	1,433,866	1,744,383	1,933,579
Germany.....	5,163,645	8,579,070	12,643,316	Korea.....	161,348	207,478	241,323
				Philippine Islands.....	98	150	200
				Total.....	42,700,000	53,600,000	63,500,000
				World's Total.....	48,500,000	61,800,000	72,800,000

(a) Information not available.

(b) Years ended June 30th.

(c) January-February only, after which date, production is included with that of Germany.

Table 169.—World Production of Steel Ingots and Castings, 1933-1935

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	7,024,000	8,849,700	9,858,700	Italy.....	1,743,163	1,803,406	2,094,807
Union of South Africa (b)	9,000	11,000	(a)	Latvia.....	1,336	2,076	2,535
Canada.....	409,979	757,782	941,527	Korea.....	(a)	58,755	95,885
India.....	694,073	797,569	862,344	Luxembourg.....	1,815,694	1,901,898	1,807,818
Australia (c).....	392,666	518,326	696,861	Poland.....	820,006	833,829	929,670
Total.....	8,500,000	10,900,900	12,400,000	U.S.S.R. (Russia).....	6,734,000	9,540,100	12,209,000
FOREIGN COUNTRIES				Spain.....	498,651	636,641	576,923
Austria.....	222,230	304,324	358,246	Sweden.....	619,913	848,176	852,237
Belgium.....	2,688,251	2,897,248	2,971,319	Mexico.....	75,000	(a)	(a)
Czechoslovakia.....	722,898	925,594	1,159,872	United States.....	23,232,347	(d) 26,055,289	(d) 34,092,594
France—				Japan.....	3,145,660	3,682,861	4,628,315
Saar.....	1,649,798	1,919,614	(e) 318,438	China.....	25,000	50,000	(a)
Other districts.....	6,427,754	6,076,662	6,177,643	Brazil.....	52,000	61,000	63,000
Germany.....	7,335,832	11,510,831	15,889,216	Roumania.....	142,479	172,567	209,721
Hungary.....	224,067	310,000	443,000	"Manchoukuo".....	(a)	(a)	134,656
				Total.....	58,200,000	69,700,000	84,700,000
				World's Total..	66,700,000	80,600,000	97,100,000

(a) Information not available.

(b) Including rails, fishplates, etc.

(c) Years ended June 30th.

(d) Excluding steel castings which were produced by companies not manufacturing steel ingots.

(e) January-February only, after which date, production is included with that of Germany.

LITHIUM

"The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements, and lepidolite, or lithia mica, also a silicate. The lithia content of these minerals, as mined, commonly ranges from around 8 to 9 per cent for amblygonite, 4 to 8 per cent for spodumene, and 3 to 5 per cent for lepidolite . . . All of the above minerals are known to occur in Canada, but there has as yet been only a small production, mainly of lepidolite and spodumene. The important deposits are all in Manitoba in the southeastern part of the province; at Bernie lake about 100 tons of spodumene and 50 tons of amblygonite were mined and stock piled in 1930; there has been only a minor amount of work done since that year and no shipments have been made to the end of 1935. Lithium minerals serve as the raw material for the manufacture of lithium chemicals and lithium metal and alloys." (Report 773—Department of Mines, Ottawa.)

"Lithium and its compounds are increasing rapidly in commercial importance. For a number of years there has been a steady output of lithium-hardened bearing metal alloys, and due to the profound influence of rather minute amounts of this ultra-light metal in such alloys, its sponsors envisage rapid expansion in its metallurgical uses . . . Lithium salts afford an extraordinarily efficient vehicle for dehumidifying air and thus making indoor atmospheres more comfortable in hot weather. "Lithiated" mineral waters consume a substantial quantity of lithium chloride and the nitrate and salicylate are employed as remedies for rheumatism and gout. Lithium hydroxide is employed in alkali storage batteries and in the ceramic industries artificial lithium compounds, as well as lepidolite, have been used to some extent, mostly as apacifiers for certain kinds of glass. Foreign trade statistics are not separately reported but it is known that there has been a substantial exportation of lithium minerals, principally South Dakota amblygonite, to Germany in recent years following a reduction in output from the Spanish Peninsula. On the other hand, trial shipments of South African lepidolite have been made with a view of creating a market for this material in the United States." (Minerals Year Book, 1936—United States Bureau of Mines.)

"Metal and Mineral Markets", New York, quote October, 1936, lithium metal per pound, 98 to 99 per cent, 100 pound lots, \$15. Amblygonite—August, 1936, per ton, f.o.b. mines, 8 to 9 per cent Li_2O , \$34 to \$35.

No imports into Canada of lithium, lithium alloys or compounds, described as such, were reported in 1935.

The following amounts of lithia mica were produced during 1932, 1933 and 1934:—

	1932	1933	1934
	(long tons)		
Germany.....	156	72	(a)
Portugal.....	2,014	870	294

(a) Information not available.

MAGNESIUM

"The rapid development of aviation, and the growing importance of the air arm for military purposes, has caused the question of magnesium production to be seriously regarded in all the more important countries.

"At present magnesium is produced in Germany, Great Britain, the United States, Russia and Japan. In Italy the Montecatini Concern obtained permission in August, 1935, from the Corporation Minister to erect works for magnesium production, and it has been planned to commence production of magnesium in Holland and Austria.

"The raw materials of most of the producers are magnesite or magnesium chloride. The Dow Chemical Company uses a brine rich in magnesium salts as the source of magnesium (U.S.A.) while the Nichiman Magnesium K.K. uses both magnesium oxide and the sulphate. Wintershall A. G. and the Russians produce magnesium directly from carnallite. The Österreichisch Amerikanischen Magnesit A.G., at Rodenthein in Austria has developed a process by

which magnesium metal is obtained from magnesite or from dolomite, by reduction with carbon . . . It has been asserted that, on a corresponding scale, magnesium can be produced at less cost than aluminium." (The Mining Journal, London.)

A plant is now operating on the inland shores of San Francisco Bay for the manufacture of magnesium compounds from sea water by a chemical precipitation process and it is reported that in operating practice approximately 100 gallons of Bay water is pumped to produce 1 pound of MgO.

The metal is not yet made in Canada and data relating to imports into Canada of magnesium are not published separately.

New York prices for the metal, October 8, 1936, per pound, ingots (4 x 16 inches) 99·8 per cent, 30 cents in carloads; 32 cents in 100 pound lots or more, l.c.l. $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, 1 and 2 pound sticks, 5 cents per pound over ingot price. New magnesium ingot and stick sold or used by the producer in the United States totalled 4,241,218 pounds in 1935.

MANGANESE

The only production of manganese ore in Canada since 1931 represented a shipment of 100 tons valued at \$800 in 1935. This was made from a deposit located at Turtle Creek, Albert county, New Brunswick, and was consigned to the steel industry. The Department of Mines, Ottawa, report that the manganese ores, which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were usually in small lots and were derived from various localities in Nova Scotia, New Brunswick and British Columbia.

In June, 1936, the technical press reported the development in the electro-metallurgical laboratory of the United States Bureau of Mines of a method for the production of metallic manganese from ore by leaching and electrolysis. The pure metal so produced, it is stated, is in the form of bright, coherent sheets, perfectly stable in air; according to report the process is simple and cheap and adaptable to commercial utilization. The electrolyte used is manganese sulphate . . . with large manganese deposits located within reach of power from Boulder Dam and other federal projects, the power cost of producing high-purity manganese metal may be as low as \$10 a ton.

The National Association of Purchasing Agents, New York, states in its report A-19, of October, 1936: "It is estimated that more than 90 per cent of the world's consumption of manganese ore is in the manufacture of iron and steel. Most of the manganese ore entering the ferrous metallurgical industry is used in making ferromanganese and spiegeleisen, the forms in which manganese is usually added to steel. Silico-ferromanganese and silicaspiegel are used in certain grades of steel and may replace ferromanganese and spiegeleisen. Considerable manganese ore is also added to the pig-iron blast furnace charge when the iron-ore burdens are deficient in manganese. Manganese steels are utilized in the manufacture of plates, shapes, structural bars, open-hearth rails, spring steels, car wheels, tires, axles and for many other purposes where toughness and resistance to abrasion is required. Manganese is also used in the formation of alloys of copper, zinc, aluminium and other metals. Probably the most extensive chemical use of manganese ore is in the manufacture of dry cells; another outlet taking advantage of the oxidizing power of manganese dioxide is in the glass and ceramic industry; fine glassware is almost entirely decolorized by the addition of manganese oxide. Manganese compounds are used extensively as driers in the preparation of varnish and paint, due to their catalytic properties; manganese ore required for this use must be of relatively high grade. The manufacture of manganates and the permanganates for use as germicides and deodorizers is now an important branch of the chemical industry; the permanganates are also used for bleaching in the textile industry.

Manganese ore quotations, October 22, 1936, New York, were: per long ton unit of Mn., c.i.f. North Atlantic ports, cargo lots, exclusive of duty; Brazilian 46 to 48 per cent Mn. 24 cents; Chilian, 47 per cent minimum, 25 cents; Indian, 48 to 50 per cent, 25 cents; Caucasian, 52 to 55 per cent, 27 cents; South African, 50 to 52 per cent, 27 cents; 44 to 48 per cent, 25 cents.

Table 170.—Production of Manganese Ore in Canada, 1923-1935

Year	Tons	Value
		\$
1923.....	200	1,400
1924.....	584	4,088
1925-29.....		
1930.....	273	1,356
1931.....	117	2,893
1932-34.....		
1935.....	100	800

NOTE.—For years 1886 to 1922, see previous reports.

In 1935 Canada imported 73,560,900 pounds of manganese oxide valued at \$353,414 and of this quantity, 3,448,800 pounds came from the United States, 6,056,900 pounds from British South Africa, and 63,488,000 pounds from the Gold Coast. Total manganese oxide imports in 1934 amounted to 61,906,900 pounds worth \$234,236.

Table 171.—Consumption of Manganese Ore or Manganese Compounds in Specified Canadian Industries, 1934 and 1935

Industry	Item	1934		1935	
		Quantity	Value	Quantity	Value
		Pounds	\$	Pounds	\$
Electrical Apparatus and Supplies.....	Manganese oxide.....	2,646,545	37,275	3,484,351	60,333
Paints, Pigments and Varnishes.....	Manganese salts.....	49,543	4,529	90,042	13,913
Primary Iron and Steel.....	Ore manganiferous (foreign)...	1,682,240	12,235	828,000	6,632

Table 172.—World Production of Manganese Ore, 1933-1935

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Gold Coast.....	(b)265,140	365,178	430,659	U.S.S.R. (Russia).....	982,000	1,792,000	2,340,000
Northern Rhodesia.....	5,367	2,041	3,976	Spain.....	2,789	3,736	1,240
Union of South Africa.....	20,894	64,463	93,943	Sweden.....	6,124	6,212	7,114
India.....	218,307	406,306	641,483	Egypt.....	184	944	85,924
Canada.....			89	Morocco (French zone).....	4,752	7,161	25,261
Unfederated Malay States.....	13,193	18,876	28,054	Portuguese India.....	1,600	3,800	4,000
Australia.....	149	105	148	Cuba (e).....	89,224	267,115	90,650
Total.....	520,000	840,000	1,200,000	Porto Rico (exports).....	1,638	1,711	3,358
FOREIGN COUNTRIES				Mexico.....	564	654	3,166
Austria (d).....	(a)	(a)	(a)	United States (c).....	19,146	26,514	26,428
Czechoslovakia.....	16,799	58,433	70,306	Argentina.....	404	574	432
Germany.....	554	507	220	Brazil (b).....	24,500	2,264	59,711
Greece.....	1,578	1,187	416	Chile.....	753	4,000	4,300
Hungary.....	6,134	10	6,192	China.....	9,350	1,899	1,000
Italy.....	4,453	6,831	8,983	Japan.....	42,847	56,262	70,527
Yugoslavia.....	521	1,086	913	Netherlands East Indies....	10,298	11,451	12,158
Roumania.....	2,730	11,867	19,343	Turkey.....	7,600	13	15,350
"Manchoukuo".....	740	700	(a)	French Indo-China.....			1,545
Portugal.....	25	290	156	Total.....	1,240,000	2,100,000	2,800,000
				World's Total.....	1,760,000	3,000,000	4,000,000

(a) Information not available.

(b) Exports.

(c) Shipments. Excluding the following quantities of ore containing 10 to 35 per cent Mn, which is recorded by the United States Bureau of Mines as iron ore:—

1933.....	12,779 long tons
1934.....	23,231 "
1935.....	93,291 "

(d) Manganese content of manganese ore and manganiferous iron ore.

(e) Low grade ore before concentration.

MERCURY

There has been no Canadian production of new mercury reported since 1897. Previous to this a small output of quicksilver was recorded as having been produced in British Columbia from a property situated on the north shore of Kamloops lake.

"As Italy and Spain are the largest mercury-producing countries in the world, the war between Italy and Ethiopia, economic sanctions against Italy, and internal disorders in Spain, raised the question of possible difficulty in obtaining supplies of mercury and increased demand for the metal in the last quarter of 1935. Sixty per cent of the total imports into the United States were entered in the last quarter of 1935. Italy's output of mercury in 1935 totalled 25,469 flasks, nearly double the production of 1934 but much below the level of years prior to 1933. Exports of mercury from Spain are reported to have doubled in 1935. Production in the United States in 1935 totalled 17,518 flasks, properties in Arkansas, California, Oregon and Texas accounting for 92 per cent of this output." (Metal and Mineral Markets, New York.)

It is interesting to note that the General Electric Company reports that there is no other known method of generating power from a fuel so efficiently as that represented by the mercury and steam cycle; mercury approximating 750,000 pounds or 10,000 flasks is at present circulating in three boilers and turbines driving generators in the eastern United States.

A revival in mercury mining occurred in Canada during 1936 when the Manitou Mining Co., Limited, conducted surface and underground development work on a cinnabar deposit located at Mud creek in the Lillooet mining division of British Columbia.

The average quoted price for quicksilver in London was \$60.74 per flask in 1935 and in New York, \$71.99 (flask, 76 pounds).

Table 173.—Imports into Canada of Mercury, 1927-1935

Year	Quantity	Value
	Pounds	\$
1927.....	124,099	160,330
1928.....	199,603	269,746
1929.....	346,701	478,048
1930.....	105,755	153,837
1931.....	21,159	25,454
1932.....	43,230	37,068
1933.....	49,066	35,057
1934.....	246,892	183,366
1935.....	121,471	98,871

Table 174.—Mercury Consumed in Specified Canadian Industries, 1934 and 1935

Industry	1934		1935	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
Boiler Compounds.....	730	613	770	689
Medicinal and Pharmaceutical preparations.....	21,452	16,112	25,826	18,524
Other chemicals.....	42,998	52,903	78,080	57,093

Table 175.—World Production of Mercury, 1933-1935

(Supplied by *Imperial Institute*)

(Pounds)

Producing country	1933	1934	1935
BRITISH EMPIRE			
Australia (concentrates).....	47	167	1,299
New Zealand.....	7,500	3,852	563
FOREIGN COUNTRIES			
Austria.....	440		
Czechoslovakia.....	14,872	58,052	152,379
Italy.....	1,338,058	972,238	2,142,893
Spain.....	1,491,601	2,416,729	2,702,500
Mexico.....	340,372	348,161	477,063
United States.....	734,844	1,173,820	1,331,368
Turkey.....	1,748	3,192	1,929
Japan.....	17,807	14,930	11,219
China.....	900	1,200	(a)
Korea.....	(a)	(a)	306
Roumania.....	600	139	28
Bolivia (exports).....	(b) 62,100	(b) 50,384	32,040
Germany (Hg content of ore).....	(a)	(a)	8,800
U.S.S.R. (Russia).....	510,000	590,000	(a)
World's Total.....	4,500,000	5,700,099	7,500,000

(a) Information not available.

(b) Gross weight, including packing.

MOLYBDENITE

The last commercial production of molybdenite ore or concentrates in Canada was in 1931 when 1,222 pounds of molybdenite concentrates were shipped from a property located in Ontario. The Department of Mines, Ottawa, in its report No. 773 for 1935, states: "The Phoenix Molybdenite Corporation, Toronto, carried out extensive prospecting on its property in Bagot township, 8 miles southwest of Renfrew, Ontario. The shaft was sunk to 100 feet, from which depth about 1,000 feet of drifting and crosscutting was undertaken. The main ore zone, previously worked by open cut methods, was found at depth and some rich pockets of molybdenite were discovered. About 1,000 tons of milling ore were hoisted and placed in storage. Prospecting was continued by A. V. Dukes on the molybdenite property near Mace, Steele township, Cochrane district. Prospecting was conducted in Quebec on molybdenite properties located in Masham township and near Portneuf Station, 40 miles west of Quebec city.

In British Columbia exploration was recently conducted on molybdenite bearing veins occurring in the Usk area of the Northeastern Mineral Survey District (2); the mineral is found here in quartz veins in association with gold.

The United States Bureau of Mines reports that in 1935 the Climax Molybdenum Company, with its mine at Climax, Lake county, Colorado, maintained its lead as the largest producer of molybdenum in the world. During the year the company mined 1,267,459 tons, from which 9,526 tons of concentrates were produced; these concentrates yielded 10,168,635 pounds of the metal.

The correspondent of the Mining Journal, London, reported that the burning of the Knaben mill in 1934 accounted for the serious drop in molybdenite output, but in 1935 a new and enlarged mill was put in operation, with the resulting increase in the year's output. Norway possesses molybdenite deposits covering a considerable area, but at the present time only one mine is working, Knaben II in Fjotland.

Molybdenum steels are used largely in the automobile industry, oil refining equipment, high pressure boilers and turbines and various other machinery, while molybdenum cast irons are employed for camshafts, clutch plates, cylinder blocks and other machinery parts.

"Metal and Mineral Markets", New York, quotations for molybdenum metal, October 1, 1936, per pound, in 10 to 49 lb. lots, C.P. Powder, \$9.50; 97 per cent, \$4.10. Molybdenum ore, per pound of contained MoS_2 , nominally 42 cents for 90 per cent concentrate. London, per long ton unit, nominal at 37s. for 90 per cent concentrate.

Imports of calcium molybdate when imported into Canada by manufacturers of steel for use exclusively in the manufacture of steel in their own factories totalled 74,994 pounds valued at \$26,192 in 1935 as compared with 35,187 pounds worth \$15,586 in 1934. No imports of molybdenum metal were recorded.

Table 176.—Production of Molybdenite in Canada, 1925-1935

Year	Ores mined	Ores treated	Ores and concentrates shipped		MoS ₂ content of shipments	MoS ₂ production (probable recovery)	
	Tons	Tons	Tons	Value (a)	Pounds	Pounds	Value (b)
1925	3,000	2,779	15.3	11,176	22,350	22,350	11,176
1926	4,186	4,490	12.6	10,472	20,943	20,943	10,472
1927							
1928							
1929	9,100	2,900	9.5	6,400	16,150	16,150	6,400
1930							
1931	12	12	0.61	280	1,222	1,222	280
1932-1934*							
1935							

(a) Value as given by the operators. (b) Estimated at the average market value of molybdenite.

NOTE.—For years 1902 to 1924 see previous reports.

* It was reported that 200 tons of surface ore was milled during 1934 at a molybdenite property in Renfrew County, Ontario; no shipments were reported.

Table 177.—World Production of Molybdenum Ore, 1933-1935

(Supplied by *Imperial Institute*)
(In cwt.—112 pounds of concentrates)

Country	1933	1934	1935
BRITISH EMPIRE			
Australia	208	89	212
FOREIGN COUNTRIES			
Roumania (Bi-Mo Ore)			280
Yugoslavia			363
Norway (MoS ₂ content)	8,149	4,793	12,736
French Morocco (MoS ₂ content)	3,700	2,850	3,230
United States (MoS ₂ content)	84,554	139,315	171,310
Korea	2,070	2,037	2,077
Peru (MoS ₂ content)	198	172	194
Mexico	1,303	15,315	22,528
Japan		99	127
China (MoS ₂ content)	21	22	(a)

(a) Information not available.

RADIUM-URANIUM

Commercial production of radium-uranium bearing ores in Canada comes at the present time entirely from the Great Bear lake district in the Northwest Territories. Eldorado Gold Mines Limited, is the principal operator in this field and during 1935 the mill of this company treated 14,402 tons of ore, of which 2,560 tons came from development headings. Pitchblende and silver concentrates totalled 296 tons valued at \$752,918. A carload of 34 tons of pitchblende concentrate was flown to railhead during the winter flying season. Underground development in 1935 was confined to the main vein (No. 2); the shaft was extended to the 500 level in 1936; in September, 1936, it was reported that underground development at the 465 foot level, deepest working horizon at the property, was disclosing particularly favourable conditions, with high grade silver and pitchblende present. It was reported that the recovery of radium, uranium, silver and lead during 1935 at the company refinery, located at Port Hope, Ontario, amounted to about \$490,000; a chemical process suitable for every type of ore, sorted or concentrated at the mine, was established at the plant in November, 1935. The uranium products of the company are principally orange and yellow sodium uranate and uranium oxide, silver sulphide and radium bromide.

It was reported that development work was conducted during 1935 on the pitchblende deposits occurring at Beaverlodge Lake some 100 miles south of the Eldorado property; these deposits are being explored by Hottah Lake Gold and Radium Mines, Ltd. In Ontario development work was continued by Canadian Radium Mines Ltd. at its property near Wilberforce where radio active minerals are reported to occur.

The Department of Mines, Ottawa, reports that several small showings of pitchblende were discovered in 1935 on claims located near the new townsite of Goldfields, on the north shore of Lake Athabasca; the veins appear to be very narrow and hardly suggest the presence of commercial ore-bodies.

During 1935 the output of carnotite ores in the United States amounted to 1,145 short tons valued at \$56,223, containing 3,329 milligrams of radium, 22,009 pounds of uranium (25,946 pounds U_3O_8), and 50,776 pounds of vanadium (90,671 pounds V_2O_5). The ore ranged from 1 to 4 per cent in U_3O_8 content and from 3.5 to 12 per cent in V_2O_5 content. Most of the ore or concentrates was shipped to the Vitro Manufacturing Co. of Pittsburgh, Pa., and the Shattuck Chemical Company of Denver, Colorado.

The Union Minière du Haut-Katanga, operating mines in the Belgian Congo is the world's largest producer of radium and the following statement has been taken from the company's annual report for 1935: "Our sales of radium remain stationary. Owing to some facilities granted by our Society to some public institutions, it has been possible to perfect some new methods of treatment by telecurietherapy which are likely to create, in the near future, a better demand for radium".

Although radium has found its greatest usefulness in the field of medicine, it has taken a front rank position during recent years in metal manufacturing, where it is employed in the detection of flaws. The element with zinc sulphide is also employed in the manufacture of luminous paint.

Uranium in various forms is used chiefly as a colouring material in the ceramic, glass and textile industries while the metal itself is employed in the manufacture of photoelectric cells, ferro-uranium, flow-tube electrodes, and X-ray targets.

Uranium oxide was quoted—New York—October, 1936, \$1.50 per pound. Radium—per mg. radium content, \$40.

Radium imports into Canada during 1935 were valued at \$150,643 of which \$142,603 came from the United Kingdom and \$8,040 from the United States. Total imports in 1934 were worth \$211,140. Statistics relating to imports and exports of uranium or uranium products are not published separately.

Table 178.—World Production of Uranium Minerals, 1933-1935

(Supplied by Imperial Institute)

(Cwt. 112 pounds)

Producing Country	1933	1934	1935
BRITISH EMPIRE			
Canada.....	(b)	(b)	(b)
FOREIGN COUNTRIES			
Czechoslovakia (U_3O_8).....	236	236	311
Portugal.....	1,233	791	117
United States (U_3O_8).....	18	70	232
Belgian Congo.....	(c)	(c)	(c)

Uranium minerals are also produced in Russia.

(b) During 1933 and 1934, 3,021 mgrms. and 3,000 mgrms. of radium of 98 per cent average concentration and 34,940 lb. and 27,000 lb. of uranium salts were produced respectively. In addition to uranium products, the production of radium in Canada to November, 1936, was 1 ounce.

(c) The output of uranium minerals is not available for these years, but it is reported that the radium produced from these ores amounted to 6.7 grams in 1933. This production of radium represents the greater part of the world's supplies.

SELENIUM

Selenium production in Canada represents a by-product in the electrolytic refining of blister copper made from Manitoba, Ontario and Quebec ores. It is recovered at Copper Cliff, Ontario, by the Ontario Refining Company, Ltd., and at Montreal East, Quebec, by the Canadian Copper Refiners, Ltd. Output in 1935 totalled 366,425 pounds valued at \$703,536 and of this total quantity, 206,421 pounds were credited to Quebec, 75,363 pounds to Ontario, 65,074 pounds to Manitoba, and 19,567 pounds to Saskatchewan.

In the United States, 232,831 pounds of selenium were sold by producers in 1935 while in Sweden the enlargement of a by-product plant at Boliden increased productive capacity for the element. In Japan a small quantity of selenium is obtained in refining copper.

Selenium is employed in the manufacture of alloys, glass, and rubber products, and the recent development in selenium rectifiers for converting alternating into direct currents is interesting. The United States Bureau of Mines describes the presence of selenium in water samples from the Colorado river as indicating a previously unsuspected source of selenium.

Selenium was quoted—New York—October, 1936, per pound, black, \$2; powdered, 99.5 per cent pure.

Statistics relating to Canadian imports and exports of selenium are not published separately.

Table 179.—Production of Selenium in Canada, 1932-1935

Year	Pounds	\$
1932.....		
1933.....	48,221	70,345
1934.....	104,924	171,311
1935.....	366,425	703,536

SODIUM

Large quantities of sodium are used in oil refining and in various chemical industries involving organic syntheses. Its employment has reached a point where it is shipped in 40 ton tank cars. These cars, recently described, are equipped with steel coils welded on the outside in which cold oil is circulated while the molten metal is run in, and hot oil when remelting for unloading. For deoxidizing brasses and other non-ferrous alloys, in which a content of 2 per cent or more metallic zinc may be tolerated, a sodium-zinc alloy, containing 2 per cent sodium, has been developed. Addition of this new alloy to brasses generally tends to improve the physical properties. Sodium is not yet produced in the metallic form in Canada and no imports of the metal were reported in 1935.

TANTALUM

Tantalum metal is not produced in Canada, however, it is interesting to note that the Department of Mines, Ottawa, reports that columbite-tantalite has been found in small quantities in a number of feldspar mines in the Dominion.

Tantalum is malleable, ductile, tough and has a high tensile strength; the metal is very resistant to chemical reagents.

The metal in the pure form finds employment in various shapes in the chemical and electrical industries while tantalum carbide is utilized for machine tools, drawing dies, etc.

Imports of tantalum and columbium ores into the United States in 1935 aggregated 1,190,398 pounds valued at \$107,079, of which 6,083 pounds (tantalite) valued at \$9,342 came from Australia and 1,184,315 pounds (columbite) valued at \$97,737 came from Nigeria. In 1934 imports from Australia amounted to 24,630 pounds valued at \$35,441. No imports or exports of tantalum ores or metal were recorded in Canada during recent years.

New York quotations for tantalum, October, 1936, per kilo, base price, \$160.60 for C. P. rod; sheet, \$143. Discounts on volume business.

TELLURIUM

Canadian production of tellurium totalled 16,245 pounds valued at \$32,850 in 1935 and, as in the case of selenium, the element was recovered as a by-product in the refining of blister copper by the Ontario Refining Company, Ltd., and the Canadian Copper Refiners, Ltd. Present consumption of the metal is chiefly in the making of lead alloys, rubber compounds, and in the Tainton electrolytic zinc process. "New Lead Alloys and Their Application in the Construction of Plant" appearing in "The Chemical Age" London, states: "The most important development in alloys of lead in recent years is based on the observations that so small a quantity as 0.05 to 0.065 per cent tellurium introduced into lead effects profound changes in the physical properties of the metal without sacrifice in corrosion resistance, whilst still preserving the essential properties of lead. Tellurium added to lead effects the following fundamental changes in the physical structure of the material: (1) grain is refined in a remarkable way, (2) the temperature at which recrystallization occurs is raised very appreciably, (3) work-toughening properties are imparted,

(4) tensile strength is practically doubled and more than doubled at 100° C., (5) resistance to fatigue is increased almost three times at ordinary temperature and four times at 100° C. when compared with ordinary lead used under the same conditions."

It was recently reported that tellurium was being recovered at Odessa, Russia, from the Cottrell dust of a superphosphate works, and also in Russia as a by-product from treatment of Kyshtym copper ores.

New York quotations, October, 1936, for tellurium metal—per pound, \$1.75 to \$2

Statistics relating to Canadian exports or imports of tellurium are not published.

Production of Tellurium in Canada, 1934-1935

Year	Quantity	Value
	Pounds	\$
1934*.....	5,130	25,599
1935.....	16,425	32,850

*First commercial production in Canada.

TIN

Tin is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in southeastern Manitoba. It has also been reported at New Ross, Nova Scotia. No tin ore deposits have been worked or tin ore production recorded in Canada during recent years.

A review on tin in 1935 by the Mining Journal, London, refers to restriction as follows:—"As the ability of international restriction to produce, if desired, a complete famine in tin has been demonstrated during the year, the fundamental question, not merely for the moment but over a period of years, is whether, when the current agreement comes to an end, it will be succeeded by a new agreement, and if so, with what components and for what period. Although nothing authoritative, so far as the writer knows, has been published on this latter point, recent negotiations are believed to have in view a five years duration. Comparatively early in 1935 the Bolivians intimated that they did not wish to continue the Buffer Pool beyond the end of the year, and in the absence of any knowledge of the I.T.C. discussions it was inferred, in view of the terms of the existing agreement, that unless the agreement itself was renewed during 1935 any country might be free to withdraw. However, the committee was satisfied to stand on the letter of the agreement which said that renewal must be considered twelve months before it was due to expire, so this apprehension was allayed. None the less the main underlying preoccupation during the year was the question of the continuation of restriction in principle . . . The average price for cash standard for the year was but little below the high figure for 1934, coming out at £225 14s. 2d. per ton against £230 7s. 6d. The highest quoted figure for cash standard was £248 on October 14, the highest figure since January, 1928. The average price of straits in New York was 50.389 cents per pound as against 52.16 cents in the previous year while English refined was 50.067 cents against 52.04 cents."

Table 180.—Available Statistics on the Consumption of Tin in Specified Canadian Manufacturing Industries, 1934-1935

Industries	Items (used)	1934	1935
		Pounds	Pounds
Brass and copper products.....	Ingots.....	261,354	254,132
	Scrap.....	91,939	26,954
	Other.....	5,038	33,681
White metal alloys.....	Pig.....	2,455,847	2,898,077
Iron and steel.....	Tin.....	1,214,493	1,067,973
Grand Total.....		4,028,671	4,280,817

Table 181.—Imports into Canada of Tin, 1933-1935

	1933		1934		1935	
	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
Tin in blocks, pigs and bars.....	2,834,100	1,149,378	3,999,900	2,053,773	4,677,000	2,323,177
Tin foil.....	8,271	4,076	35,158	18,990	45,245	19,756
Tin plate scrap.....	3,416,000	11,310	1,426,000	6,999	2,952,000	17,841
Collapsible tubes.....		81,258		38,597		44,335
Tin plated kitchen and dairy hollow-ware not painted or decorated.....		39,355		41,463		38,513
Manufactures of tin plate, painted, japanned, decorated or not, and manufactures of tin, n.o.p.....		437,982		386,232		348,912
Tin cans and containers for food.....		138,297		186,175		190,135
Containers manufactured from tin plate, n.o.p.*.....		165,509		239,497		300,819
Bichloride of tin or tin crystals.....	826,632	149,880	333,311	88,327	628,399	167,922
Phosphor tin and phosphor bronze in blocks, etc.....	506,464	135,997	826,611	232,483	819,164	213,812
Oxide of tin and copper.....	144,657	50,743	207,769	86,376	222,388	92,822
Sheets, plates, hoop, band or strip, coated with tin, n.o.p.....	149,713,800	6,549,512	159,429,000	7,319,878	149,672,100	7,301,893
Total.....		8,913,297		10,698,790		11,059,937

*From April 1, 1933.

Table 182.—World Production of Tin Ore, 1933-1935

(Supplied by Imperial Institute—London)

(In terms of metal)

(Long tons)

Producing country	1933	1934	1935
BRITISH EMPIRE			
United Kingdom.....	1,542	1,999	2,050
Nigeria.....	3,755	5,000	6,299
Northern Rhodesia.....			5
Southern Rhodesia.....	11	11	11
South West Africa.....	144	136	164
Swaziland.....	71	114	127
Tanganyika Territory.....	59	103	145
Uganda.....	272	306	386
Union of South Africa.....	539	570	622
India.....	3,472	4,061	4,102
Federated Malay States (shipments).....	23,922	36,385	40,749
Unfederated Malay States.....	922	1,239	1,542
Straits Settlements.....	57	51	52
Australia.....	2,810	2,986	3,130
Total.....	37,600	53,000	59,700
FOREIGN COUNTRIES			
Argentina.....	45	254	(a)
Portugal.....	500	530	730
Spain.....	70	102	(a)
Belgian Congo.....	1,950	4,356	6,132
Cameroon (French).....	60	150	216
Morocco (French).....	40	40	36
Mexico.....	123	16	621
United States.....	3	8	41
Bolivia.....	17,000	(b) 22,535	(b) 25,002
China (smelter).....	8,226	7,878	9,700
French Indo-China.....	1,038	1,134	1,309
Japan.....	1,538	1,821	2,202
Netherlands East Indies.....	12,608	19,680	20,141
Siam.....	10,300	10,157	9,737
Germany.....			25
Mozambique.....			7
Total.....	53,000	68,000	76,000
World's Total.....	91,000	121,000	135,000

NOTE.—In the case of countries for which assay figures are not published the metal content of the ores has been calculated on the following percentages—South West Africa 70, Swaziland 70, Uganda 70, India 70, Belgian Congo 70, Japan 70, Siam 72.

(a) Information not available.

(b) Exports.

TITANIUM

Ilmenite, the titanium ore so largely employed in the manufacture of pigments, is known to occur at several places in Canada and commercial shipments of the mineral have been made during past years from deposits located at St. Urbain and Ivry in the province of Quebec. Shipments of Canadian titanium ore during 1935 came entirely from the St. Urbain deposits and totalled 2,288 tons valued at \$16,400. Canadian ilmenites are reported to carry from 18 to 25 per cent titanium.

Titanium pigments are being produced by three companies in the United States, two in England, one in Germany, one or two in Italy, and one or two in France. The United States Bureau of Mines reports that new plants are projected in Australia and Japan. The United States is by far the leading producer of titanium pigments, production representing 32,000 tons of dioxide in 1934, rising to 35,000 tons in 1935. The majority of the tonnage is in the titanium-calcium, titanium-barium, and other composite pigments; lead titanate, PbTiO_3 , is the latest addition to the list of titanium pigments. Rutile, the natural dioxide, is also finding a rapidly growing market, largely in the field of welding-rod coatings.

In the metallurgical field it was stated a nickel-titanium alloy with commercial possibilities was introduced during 1935 in the United States; also an alloy containing manganese and titanium in aluminium was developed.

"Metal and Mineral Markets".—New York,—quoted titanium ore, October, 1936, per gross ton, ilmenite, 45 to 52 per cent, TiO_2 , f.o.b. Atlantic seaboard, \$10 to \$12, according to grade and impurities. Rutile, per pound, guaranteed minimum 94 per cent concentrate, 10 cents; titanium metal, 96 to 98 per cent, \$6 to \$7 per pound.

Imports into Canada of antimony oxide, titanium oxide and white pigments containing not less than 14 per cent by weight of titanium totalled 2,870,491 pounds valued at \$310,083 and of this quantity, 788,253 pounds came from the United Kingdom and 2,059,204 pounds from the United States.

Table 183.—Production of Titanium Ore in Canada*, 1926-1935

Year	Quantity	Value	Year	Quantity	Value
	Short ton	\$		Short ton	\$
1926.....	200	600	1931.....	1,509	10,261
1927.....	2,029	8,980	1932.....		
1928.....	2,244	6,732	1933.....		
1929.....	2,748	7,359	1934.....	2,023	14,161
1930.....	412	1,239	1935.....	2,288	16,400

*All from Quebec.

Table 184.—Consumption of Titanium White in Canadian Paint Industry, 1932-1935

Year	Titanium white and titanium pigments	Value	Titanium white, pure	Value
	Pounds	\$	Pounds	\$
1932.....	691,304	96,759		
1933.....	1,061,249	128,969		
1934.....	1,710,188	186,678		
1935.....	(a)1,597,968	126,363	915,058	135,143

(a) In 1935 this is titanium pigments, reduced, only.

Table 185.—World Production of Titanium Minerals, 1933-1935

(Supplied by Imperial Institute, London)

(Long tons)

Producing country and description	1933	1934	1935
BRITISH EMPIRE			
Canada (shipments)—Titaniferous iron ore.....		1,806	2,043
Federated Malay States—Ilmenite.....	201	50	2,500
India—Ilmenite.....	52,980	75,644	127,051
Australia—Ilmenite.....	550	(b)	(b)
FOREIGN COUNTRIES			
Norway—Ilmenite.....	22,846	25,891	37,384
Rutile.....	55	243	122
Portugal—Ilmenite.....		434	260
Egypt.....		161	180
Senegal (exports)—Ilmenite.....	300	500	1,230
Argentina—Titaniferous iron ore.....	2,600	1,000	
Brazil (exports)—Ilmenite and rutile.....	95	114	282
Cameroon (French).....			44

NOTE.—Titanium minerals are also produced in the United States, but figures are not available for publication. In recent years, however, the production of ilmenite has been in the order of 1,000 to 5,000 tons, and that of rutile has been several hundred tons.

(b) Zircon-rutile-ilmenite concentrates are produced in New South Wales as follows:—

1934.....	51 tons
1935.....	300 "

but amount of ilmenite or rutile recovered is not recorded.

TUNGSTEN

Several occurrences of tungsten-bearing minerals are known to occur in Canada but only comparatively small shipments of tungsten ores have been made, the last being recorded in 1912 and 1917.

During 1935 the Indian Path Mines Limited conducted exploratory and development work at the Indian Path mine in Lunenburg county, Nova Scotia. The Nova Scotia Department of Public Works and Mines reported that scheelite was first encountered in the company's new shaft at a depth of about 30 feet, and at 35 feet segregations of it occur in several of the veins; the Department remarks that the magnitude of the orebody encountered and the occurrence of both scheelite and good values in gold makes this prospect a very interesting one.

The 1935 annual report of the British Columbia Department of Mines describes the occurrence of scheelite at the Ada mine, located in the North Point or Fraser river section of District No. 2, a 2-foot section of one quartz vein assayed gold trace; silver trace; tungsten 4.05 per cent. Scheelite has also been identified on the nearly "silver" group; the mineral also occurs in the Wells area on the Hardscrabble property.

The principal use for tungsten is in the manufacture of high-speed tool steels; it is also employed in certain non-ferrous alloys and special alloy steels. According to the United States Bureau of Mines cemented tungsten carbide continued to grow in favour, and cemented-carbide consumption in the United States in 1935 was the largest for any year. Although tungsten carbide cemented with cobalt is still used more than all other types of cemented carbides combined, the year has witnessed new development of several special grades, including combinations of tungsten carbide and tantalum carbide cemented with cobalt or nickel or both, also combinations of tungsten carbide and titanium carbide cemented with cobalt. Tungsten is also utilized in the making of lamp filaments, radio-tube filaments, and contact points in electrical apparatus; in the chemical industry it is employed in the manufacture of certain types of dyes (lakes), and mordants.

Imports into Canada of chromium metal and tungsten metal by manufacturers for alloying purposes totalled 36,007 pounds valued at \$22,454 in 1935 as compared with 26,222 pounds worth \$16,461 in 1934. Imports of metallic elements and tungstic acid for use in the manufacture of metal filaments for electric lamps were valued at \$85,926 in 1935 as against \$57,919 in the preceding year.

Quotations for tungsten—New York—October, 1936, were: per pound, 98 per cent, powdered, \$1.80 to \$1.90; 99.9 per cent, \$9. Tungsten ore, per unit of WO_3 , New York: Chinese wolframite, \$15.25, duty paid. Domestic scheelite, known good analysis, carload lots or more, \$15.75 to \$16. Bolivian scheelite, nominal.

Consumption of tungsten wire, etc., in the Canadian electrical apparatus and supplies industry during 1934 was valued at \$48,996 as compared with \$52,192 in 1935.

Table 186.—World Production of Tungsten Ore and Concentrates, 1933-1935

(Supplied by *Imperial Institute*, London)

(Long tons)

Producing country	1933	1934	1935	Estimated WO ₃ Content		
				1933	1934	1935
BRITISH EMPIRE						
United Kingdom—Concentrates.....	11	190	219	7	131	151
Nigeria—Concentrates.....		5	15		3	9
South West Africa—Wolfram.....		17	42		10	25
Scheelite.....			2			1
Southern Rhodesia—Concentrates.....	30	106	24	20	69	16
India—Concentrates.....	2,147	3,329	3,837	1,396	2,164	2,494
Federated Malay States—Wolfram.....	33	29	8	21	19	5
Scheelite.....	918	1,508	1,365	679	1,085	983
Unfederated Malay States—Wolfram.....	79	78	274	51	51	178
Australia—Wolfram.....	117	319	(a)	76	207	(a)
Scheelite.....		7	4		4	2
New Zealand—Concentrates.....		39	39		25	25
Tanganyika—Wolfram.....			5			3
Union of South Africa—Tungsten ore.....			9			6
FOREIGN COUNTRIES						
Portugal—Concentrates.....	298	579	1,048	189	360	666
Tin-tungsten ores.....	89	100	73	18	30	20
Spain—Concentrates.....	41	44	(a)	26	29	(a)
Mexico.....		73	49		47	32
United States—Concentrates.....	799	1,829	2,138	479	1,097	1,283
Argentina—Concentrates.....		360	531		234	(a)
Bolivia—Concentrates.....	230	782	1,344	140	469	840
Peru—Concentrates.....		11	53		7	(a)
China—Ore.....	5,608	6,205	(a)	3,365	3,723	(a)
French Indo-China—Concentrates.....	208	272	377	149	179	246
Japan—Scheelite.....	29	64	88	19	42	(a)
Korea—Ore.....	150	363	862	98	236	(a)
Netherlands East Indies—Concentrates.....		2	2		2	1

Tungsten ores are also produced in U.S.S.R. (Russia).

(a) Information not available.

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Colorado and Utah in the United States Minasragra in Peru; Broken Hill in Northern Rhodesia; and Otavi in South West Africa. It is interesting to note that a successful process of manufacturing pure vanadium and high grade ferrovanadium pig from the titaniferous magnetite ores of the Urals has been recently reported.

Vanadium is consumed chiefly in the steel industry and more particularly in the manufacture of axles, springs, crankshafts and various automobile and locomotive parts. The addition of the metal to steel imparts tensile strength, elastic limit, yield point and impact strength. The salts are of considerable importance in chemical and other industries and the pentoxide has been employed as a catalyst.

The following information relating to the occurrence of vanadium in Russian coals is taken from Transactions of the All-Union (Russia) Scientific Research Institute of Economic Mineralogy (Bulletin 87, 1936): "The majority of coals, characterized by a high vanadium content, belong to the Clarain-vitrain type and frequently have a lignite structure. A study of their general chemical composition leads one to assume the presence of ash of infiltration origin. Thus the origin of vanadium is probably related to the local conditions, that is the processes of the decay of the basic rocks of the Ural range, in which occur numerous segregations of titaniferous

magnetites, rich in vanadium . . . Considerable accumulations of vanadium (up to 9 per cent V_2O_5 in ash) are observed in the coals of the Clarain-vitrain type, as well as in lignites, confined exclusively to the Jurassic deposits of the region adjoining the Urals . . . The wide distribution of coals in some regions, from where specimens of coals enriched in vanadium were obtained raises the question as to the possibility of a practical utilization also of the ash of these coals."

New York quotation for vanadium ore, October, 1936, was—per pound, V_2O_5 contained, 27½ cents, f.o.b. shipping point.

Possible imports of vanadium or vanadium compounds or alloys are not shown separately in Canadian trade figures.

Table 187.—World Production of Vanadium Ores, 1933-1935

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1933	1934	1935
BRITISH EMPIRE			
Northern Rhodesia—(<i>V content</i>).....	55	3	170
South West Africa.....	177	324	1,570
FOREIGN COUNTRIES			
United States (V_2O_5).....	3	(a)	(a)

(a) Information not available.

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec. Brazil is the chief source of commercial zirconium ore, greatly overshadowing all other occurrences in available reserves and cheapness of exploitation. The ore in Brazil has been called brazilite, apparently a mixture of baddeleyite and zirkelite; the ore is said to occur in great masses weighing many tons and also as alluvial pebbles. British India and Australia have also produced considerable quantities of zircon during recent years.

Zirconium wire is used in radio tubes and sheet metal in spinneret cups for rayon manufacture. The United States Bureau of Mines states that zirconium-silicon and zirconium-ferro-silicon are finding a growing use in steel making and zirconium powder is used in flashlight mixtures and in ammunition primers; from a tonnage standpoint, however, the main uses of zirconium compounds are in enamels and for electrodes or welding-rod coatings. Zirconium ores imported into the United States during 1935 totalled 5,756,726 pounds valued at \$76,923.

Imports of zirconium silicate into Canada during 1935 were appraised at \$2,307 while the value of zirconium oxide imported in the same year was \$13,824.

Commercially pure zirconium metal was quoted October, 1936, New York, per pound, powdered, \$7. Zircon ore, per ton, 55 per cent ZrO_2 , f.o.b. Atlantic seaboard, carload lots, \$55; 5 ton lots, \$60. Crude granular, zircon, \$70, f.o.b. Suspension Bridge, N.Y., milled \$90.

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

Finally revised statistics relating to the metallurgical treatment in Canada of non-ferrous ores, concentrates and other mine products of primary origin during 1935 reflect not only the rapid progress in the mining of Canadian base metal ores but emphasize the great expansion, during recent years, in Canadian smelting and refining with the attendant production of highly refined metals within the confines of the Dominion.

The gross value of various products made in Canadian smelters and refineries during 1935 from almost entirely primary mine material totalled \$186,245,658 as compared with \$149,936,239 in 1934 or an increase of 24.2 per cent. Refined metal production included gold, silver, aluminium, copper, nickel, cobalt, lead, zinc, bismuth, cadmium, selenium and tellurium, while semi-processed and other end products of individual plants included copper-nickel matte, cobalt and nickel salts and oxides, radium salts, uranium compounds, arsenious oxide, sulphur dioxide, platinum metal residues, and blister copper.

The estimated cost of ores, concentrates, etc., treated throughout the year totalled \$108,081,395 as against \$78,325,552 in the preceding year. Fuel, purchased electricity, chemicals and various process supplies used during 1935 were appraised at \$18,722,680 and the net value added by the various processes was estimated at \$59,441,583 and of this value Ontario plants were credited with \$40,824,558.

Employees engaged in the smelting and refining of non-ferrous metals or ores totalled 8,944 in 1935 and \$12,687,356 were distributed in salaries and wages as compared with \$11,059,206 in 1934.

In 1935 Canada ranked third in world copper production on a smeltery basis, being surpassed only by the United States and Chile; in the production of lead during 1935 the Dominion was fourth, being surpassed, in the order of their output, by the United States, Australia and Mexico. In production of metallic zinc during 1935 Canada came third, the production of the United States being the greatest and that of Belgium ranking second.

In a review of base metal conditions (June, 1936) the British Metal Corporation Limited, London, comments as follows:—

"The demand for the non-ferrous metals, especially copper, outside the United States, now surpasses previous peak levels. It has recovered rapidly in the last three years. Cheap money, facilitated by currency depreciation, and large government spending on public works and armaments, have stimulated the heavy trades in several countries.

"In the immediate future, it can hardly be expected that the demand in Germany, Italy the United Kingdom (despite the armaments programme) and Japan, or even in Russia, will continue to expand at the same rate, but this is not to say that there will be a decline from the present levels.

"Hopes for expansion in the future lie in France and the other countries of the gold bloc, when their currency difficulties are resolved. These countries have yet to have their 'booms' and this holds also for the most recent 'deserters', Poland and Belgium.

"Looking further ahead, probably few people would deny that world trade and industry will grow in the next few years. The enormously increased stock and current output of gold, in terms of national currencies, provides an adequate basis for the world's needs of credit. (In fact, without proper safeguards, the basis for credit expansion in certain countries is now dangerously large.) Those needs, however, must be delayed until the conclusion, in the future, of agreements to stabilize exchanges (which presupposes 'appropriate' parities), to reduce trade barriers, to revive international lending and thus to effect re-distribution of gold stocks.

"The demand for the non-ferrous metals will at least keep pace with industrial demand generally, for they are consumed in new and still growing industries, like the electrical, motor and engineering.

"Unfortunately, armament output is also growing. Non-ferrous metals are widely used for armaments, but it is sometimes overlooked that armaments must partly stifle demand for peaceful purposes. If by agreement (of which there seems no prospect), world disarmament succeeded rearmament, there would be a growth of confidence, an all round lightening of taxation and a reduction of costs which would quickly expand the industries of peace. Except for temporary dislocation, the volume of world output would not be diminished. The 'set' of industry would be changed, and it might be that less non-ferrous metals, and more other commodities, would be consumed. But this is not certain, nor even likely. The uses of the non-ferrous metals in peace are no less wide than in war."

Review of the Industry by Provinces

Quebec.—Aluminium ores are not mined in Canada, however, the production of primary metallic aluminium in Quebec, from imported material has constituted an important industry for several years. The Aluminum Company of Canada, Limited, the sole producer of new metal in the Dominion, operated its Shawinigan Falls fabricating plant continuously throughout 1935; the company's reduction works at Shawinigan Falls was inactive. The reduction plant of the company located at Arvida maintained steady production of aluminium ingot during the last calendar year. The slag ore works at Arvida was not operated in 1935.

The following information relating to recent developments at Arvida is taken from an article prepared by A. W. Whitaker, Jr., and which appeared in an early 1936 issue of "Canadian Chemistry and Metallurgy":—

"The Aluminum Company of Canada, Ltd., subsidiary of Aluminum Limited, is making an important extension to its plant at Arvida, Quebec, for the extraction of alumina from bauxite by the 'Bayer' process. The new process will tie in with the existing 'Hall-Hoopes' process and utilize certain steps, buildings and equipment which have been associated with it. The extension involves the construction of new buildings and the installation of equipment to a value exceeding \$1,000,000.

"Bauxite is not found in Canada. For the most part, its occurrence is in tropical and semi-tropical countries, although no association is implied between surface temperatures and geology. The principal producing localities are: the southern part of the United States, British Guiana, Dutch Guiana, and southern Europe. Demerara bauxite from British Guiana is used by the Arvida plant and is shipped direct from Mackenzie, British Guiana, to Port Alfred on the Saguenay river, in ocean cargo steamers and thence 22 miles by rail to Arvida. Thus the production of aluminium at Arvida is an all-Empire enterprise, from mines to finished product.

"Bauxite, after grinding to a suitably fine mesh, is digested with hot caustic liquor under pressure in large steam-heated pressure vessels. The caustic soda liquor is made up in process by the reaction of soda ash and lime and the resulting calcium carbonate is removed later in the process with the red mud. The caustic soda dissolves the alumina, Al_2O_3 , almost completely. The filtrate is gradually cooled in large steel precipitation tanks to the point where crystallization of aluminum hydrate sets in, abetted by a "seed" charge. The washed aluminum hydrate is then pumped to the kiln building and passes from there through a vacuum filter which reduces the water content, to the rotary kiln. Calcination is effected in rotary cement type kilns at the relatively high temperature of 1,100 degrees centigrade to remove both free and chemically combined water and convert the hydrate to a non-absorptive oxide. In order to eliminate any possibility of contamination, fuel oil is used for firing the kiln. The calcined product, after screening, is ready for conversion to metallic aluminium, high grade abrasives, polishing compounds, spark plug insulators or other products."

During 1935 the Noranda smelter treated 1,076,232 tons of ore, concentrate, and refinery slag, and produced 77,027,969 pounds of anodes, the average analysis of which was 99.37 per cent copper, 6.97 ounces gold per ton and 14.95 ounces silver per ton, but after deducting the amount of copper, gold and silver in the refinery slag that was smelted, the estimated net production of new copper, gold and silver was 74,478,436 pounds of fine copper, 265,538 ounces of gold and 544,559 ounces of silver.

The following table shows the amount of material treated in the Noranda smelter and the production each year since commencement of operations:—

Year	Tons of ore, concentrate and refinery slag smelted	Pounds of fine copper produced	Gold produced	Silver produced
			Ounces	Ounces
1927.....	10,740	552,345	767	2,644
1928.....	271,926	33,065,261	52,949	186,277
1929.....	428,221	51,223,115	68,732	334,279
1930.....	734,072	75,509,373	117,393	691,920
1931.....	765,544	62,859,355	253,363	558,801
1932.....	918,567	63,013,485	341,350	619,597
1933.....	1,010,629	65,008,731	284,675	510,739
1934.....	1,050,684	70,175,512	248,615	552,809
1935.....	1,076,232	74,478,436	268,333*	544,559

*Includes some gold recovered in cyanide plant which did not pass through the smelter.

In 1935 the Noranda concentrator treated 1,048,806 tons of ore from the Horne mine, the average assay of which was 2.53 per cent copper, 0.133 ounce gold per ton and 0.35 ounce silver per ton, from which 213,487 tons of concentrate were produced and sent to the smelter.

The new 500 ton cyanide mill, designed to retreat the pyrite portion of the flotation mill tailing, was completed during the year and started up in May. During the last seven months of the year under review, 89,610 tons of pyrite were treated, from which 4,597 ounces of gold, were recovered.

At Montreal East, the electrolytic copper refinery of Canadian Copper Refiners, Limited, maintained steady production throughout 1935. Blister copper from Flin Flon, Manitoba, and anode copper from Noranda, Quebec, are treated in this plant for the production of refined copper, gold and silver; refined copper is marketed in the form of wire bars, ingot bars, and cathodes. Selenium is now being produced in substantial tonnage at the refinery; production of tellurium on a commercial basis was attained in 1935. A considerable quantity of scrap or secondary copper is also treated by this company.

Ontario.—The International Nickel Company of Canada, Limited, reported operations during the year as follows:—

"In 1935 a total of 3,382,409 tons of ore was mined and shipped to the smelters at Copper Cliff and Coniston. All of this ore was extracted from the Froid and Creighton properties which were operated continuously throughout the year. The Froid mine furnished 2,875,599 tons and the Creighton mine, 506,810 tons. The concentrator treated 2,584,666 tons of ore the largest tonnage handled since this plant was built. Milling was increased to 8,000 tons per day and it is planned to expand capacity to 11,000 tons per day during 1936.

"At the Copper Cliff smelter there were produced 118,016 tons of bessemer matte and 121,574 tons of blister copper. All of the reverberatory furnaces, five in number, and all twelve converters, were in use from February until the end of the year. The Orford process department was operated throughout the year with improvement in costs partly due to the increased tonnage of bessemer matte consumed.

"The Coniston smelter with the exception of the month of July ran continuously with four blast furnaces and five converters in operation. Ore to the amount of 790,351 tons was processed and 54,248 tons of bessemer matte produced.

"Increased demand for nickel necessitated operating the electrolytic nickel refinery at Port Colborne at capacity for the first time since additional units were installed in 1929. The year began with six circuits in service to which were added during the year the three reserve circuits, thus bringing the refinery to maximum output. There were produced 80,381,532 pounds of nickel in all forms.

"There was a substantial increase in the tonnage of blister copper treated in the electrolytic copper refinery of the Ontario Refining Co. Ltd., at Copper Cliff, Ontario, and plant output and copper shipments increased correspondingly. Refined copper production was 109,966 tons, comparable with 95,558 tons in 1934. A new selenium plant was completed and put in operation in March, 1935. In order to eliminate silver losses and to further increase recovery of selenium

a Cottrell electrical precipitator was installed and has shown satisfactory results. A plant to produce "single" and "double" nickel salts for the Canadian market was authorized in 1935 and is now completed and in operation."

The plants of the Deloro Smelting and Refining Company, Limited, located at Deloro, Hastings county, were operated continuously during 1935. Silver-cobalt ores from the Cobalt and Gowganda areas were treated by the company for the production of silver bullion, white arsenic, cobalt metal, cobalt oxides and salts, and nickel oxide. A silver-lead-bismuth bullion was also exported by the company. The Deloro plant has now continuously treated cobalt-silver-arsenic ores since 1907.

Eldorado Gold Mines Limited reported that ore shipments received during 1935 at its Port Hope refinery from Great Bear lake, Northwest Territories, were roasted and milled and recovery by chemical treatment of radium, uranium, silver and lead amounted to approximately \$490,000. A definite chemical process for every type of ore sorted or concentrated at the mine was established and operated in the plant in November, with satisfactory results of extraction. Treatment of silver was altered from dry smelting to wet chemical leaching, and silver is now produced in the form of sulphide at 75-80 per cent, which is sold at market prices to United States refineries. A reverberatory brick furnace, required for a preliminary salt roast of the ore, was erected and started in November. The smelting plant installed in 1934 is now used intermittently for re-working residues from the radium laboratories in which radium, silver and lead are combined in a form unsuitable for the wet process. Erection of a new laboratory for radium finishing was commenced in May, 1936. The company reported that sales of radium and uranium have been very satisfactory and have practically absorbed the entire production of the plant.

During 1935 the concentrating plant of Falconbridge Nickel Mines Limited was extended by an addition to grinding and flotation equipment. The reduction plant was in operation 346.93 days or 95.3 per cent of possible time. Results of operations were as follows:—

Total ore treated.....	302,510 short tons
Matte produced.....	10,029.50 "
Nickel in matte produced.....	5,651.55 "
Copper in matte produced.....	2,597.26 "
Metals per ton of ore.....	40.97 pounds nickel; 19.71 pounds copper
Metallurgical losses per ton of ore...	3.43 pounds nickel; 2.54 pounds copper

The refinery of the company, located in Norway, operated very steadily throughout the year; certain additions and alterations were made which increased the total capacity of the plant, including capacity for custom matte, to 7,000 short tons nickel annually; the plant (Norway) for the separation of precious metals started delivery of gold, silver, platinum and palladium; 10,753,756 pounds of nickel and 5,029,525 pounds of copper were produced.

The nickel-copper smelter of Cuniptau Mines Limited, located at Goward (Timagami) was reported in operation from January 28 to February 28, 1935, and a relatively small tonnage of matte was produced. No shipments were reported from the property during the year under review. It was stated in June, 1936, that arrangements had been completed for the sale of high grade matte to an English concern and later that the company had optioned the old Alexo Nickel Mines property in the Porcupine area.

Manitoba and Saskatchewan.—The Flin Flon mine, copper smelter and zinc refinery are situated on the interprovincial boundary of Manitoba and Saskatchewan, and for this reason, the operations of the Hudson Bay Mining and Smelting Company, Limited, are reviewed under the heading of the two provinces.

The company's annual report states that the copper smelter was operated continuously during 1935. Its operations depended almost entirely upon concentrates produced by the company as only 232 tons of customs ore and concentrates were treated during the year.

There were smelted in the reverberatory during the year 301,790 tons of Flin Flon ore and concentrates averaging gold 0.355 ounce; silver, 4.91 ounces, and copper, 8.94 per cent and in addition 232 tons of miscellaneous customs ore and concentrates yielding: gold, 923 ounces and silver, 1,951 ounces. There were produced and shipped 24,950.12 tons of blister copper with an average assay of: gold, 4.177 ounces; silver, 56.40 ounces, and copper, 98.73 per cent, containing a total of gold, 104,218 ounces; silver, 1,407,235 ounces; copper, 49,267,196 pounds; selenium, 78,006 pounds and tellurium, 9,411 pounds. The average tonnage of new material treated per day by the smelter was 894 tons.

There was treated by the concentrator during 1935 an average daily tonnage of 4,431 tons of ore or a total for the year of 1,617,438 tons. This ore averaged gold, 0.089 ounce; silver, 1.31 ounces; copper, 1.89 per cent, and zinc, 4.2 per cent. From the above tonnage there were produced 291,459 tons of copper concentrates assaying gold, 0.318 ounces; silver, 4.52 ounces; copper, 9.06 per cent, and 93,220 tons of zinc concentrates assaying gold, 0.070 ounce; silver, 1.81 ounces; copper, 0.85 per cent, and zinc, 45.2 per cent.

There were treated by the cyanide annex during the year 1,043,944 tons of sulphide ore tailings averaging gold, 0.0383 ounce per ton and silver averaging 0.5270 ounce per ton. From the treatment of these tailings there were recovered in the form of a so-called zinc dust precipitate, gold, 12,476 ounces; silver, 135,438 ounces, and copper, 58,298 pounds. This material was sent to the copper converters.

The electrolytic zinc plant operated continuously and the average grade of zinc produced during the year was appreciably higher than for any similar previous period and was 99.9909 per cent zinc. In 1935, 1,109 tons of die casting zinc were produced which averaged 99.9930 per cent zinc. There were treated by the zinc plant during the year 88,862 tons of zinc concentrates from which was produced for sale 60,104,700 pounds of zinc. There was also produced the usual zinc plant residue which was added to stock. The final experimental work was done on the cadmium precipitate during the year and there was designed a plant to recover the metals contained in the cadmium precipitate; this plant came into production during the first half of 1936.

British Columbia.—The Consolidated Mining and Smelting Company of Canada, Limited, reported that concentration costs per ton at its Kimberley concentrator were approximately the same as in 1934 although wages were about 6 per cent higher due to profit-sharing bonuses. The metal content of the feed to the mill contained 4.4 per cent less metal than that of the previous year, increasing the cost of mining and milling per pound of metal a corresponding amount. On the other hand, the silver-lead ratio increased to 0.416 ounce of silver to every unit of lead. This fact, together with the high price received for silver, more than offset the slightly lower grade of the ore mined and any increases in operating costs.

Costs in the lead smelting plant were increased both by a six per cent increase in wages, due to profit sharing, and by interrupted operations on account of smelter smoke control. The enhanced value of gold has caused increased activity in the mining of silicious gold ore; to such an extent that it was found necessary to concentrate the Rossland ores and also to curtail shipments from leasers and customs shippers. The company assisted the mine owners by lending them trained engineers to help them design, build and start up their mills.

Lead refinery operations were under constant study, and throughout the year many minor changes were made, and more are intended. The production increased from 157,673 tons in 1934 to 164,329 tons, both all-time records.

Record tonnage, costs and recoveries were made in the zinc plant in 1935. The price of cadmium advancing over three hundred per cent has increased interest in this by-product, which although present in only minute quantities, has added substantially to the company's profits.

Following is the metal production and tonnage treated during 1935 at the Kimberley and Trail plants together:—

Tons of ore treated.....	1,944,064
Metals produced—Gold.....	65,131 ounces
Silver.....	7,594,366 ounces
Lead.....	328,658,528 pounds
Copper.....	637,084 pounds
Zinc.....	239,679,806 pounds
Cadmium.....	551,199 pounds
Bismuth.....	6,718 pounds

Normal operations were continued at Anyox by the Granby Consolidated Mining, Smelting and Power Co., Limited, during the first part of the year, but in July preparations for cessation were begun. In September operations ceased completely and the crew, staff and residents gradually left. Operations at the Hidden Creek, Bonanza and Granby Point Mines of the company ceased on July 31. All plant and equipment were withdrawn from the underground workings and the mines abandoned.

Table 188.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1934 and 1935

	1934	1935
	\$	\$
Capital employed as represented by—		
(a) Present cash value of the land (excluding minerals).....	100,334,062	16,367,421
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		86,427,768
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	14,264,927	19,352,377
(d) Inventory value of finished products.....	16,584,377	7,864,817
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	14,864,056	15,673,916
Total.....	146,047,422	145,686,299

Table 189.—Principal Statistics, Including Ores, Concentrates and Residues Smelted and Value of Smelter and Refinery Products in the Non-Ferrous Smelting and Refining Industry, 1933, 1934 and 1935

	1933	1934	1935
Number of companies.....	11	11	12
Number of plants.....	14	14	14
Capital employed..... \$	146,085,284	146,047,422	145,686,299
Number of salaried employees.....	679	849	935
Salaries..... \$	1,461,380	1,842,449	2,055,694
Number of wage-earners.....	5,681	7,449	8,009
Wages..... \$	6,941,801	9,216,757	10,631,662
Value of plant products (gross) (c)..... \$	100,561,297	149,936,239	186,245,658
Estimated cost of ores, concentrates, etc., treated (a)..... \$	43,242,563	78,325,552	108,081,395
Cost of fuel and purchased electricity (b)..... \$	7,809,936	10,477,562	11,242,698
Process supplies other than items (a) and (b)..... \$	*	*	7,479,978
Value added by smelting..... \$	57,318,734	71,610,687	59,441,587

NOTE.—In 1935, for the first time, the value of process supplies, including the cost of purchased electricity and the cost of fuel used was deducted from the value of production. Therefore, the value added by smelting in 1935 is not comparable with those of the preceding years.

*Information not available.

(c) Products include gold, silver, platinum metals; blister and anode copper refined lead, zinc, copper and nickel; nickel-copper matte, nickel oxide, nickel salts, cobalt, cobalt oxide, aluminium, base bullion, cadmium, bismuth, arsenic, tellurium selenium, radium and uranium salts and oxides and sulphur.

Table 190.—Number of Wage-Earners by Months, in the Non-Ferrous Smelting and Refining Industry, 1933, 1934 and 1935

Month	1933	1934	1935
January.....	5,003	6,870	7,280
February.....	4,831	6,832	7,407
March.....	4,926	7,034	7,452
April.....	4,890	7,264	7,636
May.....	4,910	7,530	7,945
June.....	5,534	7,717	7,982
July.....	6,080	7,734	8,201
August.....	6,322	7,767	8,495
September.....	6,368	7,595	8,231
October.....	6,478	7,816	8,365
November.....	6,396	7,620	8,587
December.....	6,410	7,606	8,529
Average.....	5,681	7,449	8,009

Table 191.—Capacities of Canadian Copper Smelting and Refining Works, 1935*

Company	Blast furnaces		Reverberatories		Converters	
	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates
Consolidated Mining & Smelting Co. (†).....			1	48,000	2	16,000
Falconbridge Nickel Mines.....	1	200,000			2	35,000
Hudson Bay Mining & Smelting Co.....			1	325,000	2	
Noranda Mines.....			2	900,000	4	150,000
International Nickel Co.....	4	800,000	5	2,100,000	17	

ELECTROLYTIC COPPER REFINERIES—		Annual capacity—short tons
Canadian Copper Refiners, Ltd.....		65,000
Ontario Refining Co., Ltd.....		120,000

*American Bureau of Metal Statistics.

†Idle.

Table 192.—Capacity and Production of Electrolytic Zinc Plants and Lead Smelting Capacity in Canada, 1933-1935

—	Maximum horse-power used	Estimated annual capacity for cathode zinc (short tons)	Actual production as ingot zinc (short tons)		
			1933	1934	1935
Consolidated Mining & Smelting Co., of Canada, Ltd...	73,000	146,000	68,810	110,217	119,051
Hudson Bay Mining & Smelting Co., Ltd.....	15,000	34,000	23,153	24,714	30,052

LEAD SMELTING CAPACITY IN CANADA, 1935.

Company	Situation of plant	Number of blast furnaces	Annual capacity (tons of charge)
Consolidated Mining & Smelting Co.....	Trail, B.C.	5	700,000

Supplied by the American Bureau of Metal Statistics.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS, PEAT AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada

1. General Review
2. Commodity Statistics on Coal—including Tables on Output, Disposition, Shipments, Imports into Canada and Exports, Consumption and World Output

The Coke and Gas Industry in Canada

The Peat Industry in Canada

The Petroleum Industry in Canada

1. Production of Crude Petroleum
2. Production of Petroleum Products

NOTE.—In order to correlate data, regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, peat and petroleum industries. This survey presents information in detail regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

THE COAL MINING INDUSTRY

Canadian mines produced 13,886,006 tons of coal worth \$41,963,110 during 1935, as compared with 13,810,193 tons valued at \$42,045,942 produced in the preceding year. The 1935 output consisted of 9,748,841 tons of bituminous coal, 566,425 tons of sub-bituminous coal and 3,572,740 tons of lignite coal. Production during 1934 included 10,058,782 tons of bituminous coal, 537,508 tons of sub-bituminous coal and 3,213,903 tons of lignite coal.

Nova Scotia was the principal coal-producing province in 1935, producing 5,822,075 tons; this total was 8.2 per cent below the 1934 output of 6,341,625 tons. Output in New Brunswick advanced 9.9 per cent to 346,024 tons from the 1934 total of 314,750 tons. Manitoba mines produced 3,106 tons as against 4,113 tons in the preceding year. An increase of 1.4 per cent was recorded in Saskatchewan's output; the 1935 total was 921,785 tons and the 1934 production, 909,288 tons. Alberta operators reported an output of 5,462,894 tons or 14.9 per cent above the 1934 production of 4,753,810 tons. British Columbia mined 1,331,287 tons as compared with 1,485,969 tons in 1934. The Yukon output rose to 835 tons from the 1934 total of 638 tons.

A steady decline was shown in the exports of Canadian coal from 1927 to 1933; in the former year, 1,113,330 tons were exported while in the latter year only 259,233 tons were shipped from Canada. In 1934, exports advanced to 306,335 tons and in 1935 a further increase to 418,391 tons was recorded. The 1935 exports were made up of 295,012 tons cleared through Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario ports and 123,379 tons shipped through Manitoba, Saskatchewan, Alberta, British Columbia and the Yukon ports.

Canada imported 13,006,021 tons of coal in 1935; this represented a decline of 5.8 per cent from the 1934 total of 13,809,045 tons. Receipts of anthracite coal in 1935 totalled 3,451,318 tons, of which the United States supplied 1,670,085 tons; Great Britain, 1,454,521 tons; Germany, 205,045 tons; Belgium, 67,220 tons and French Indo-China, 54,447 tons. Great Britain supplied 42.1 per cent of Canada's anthracite requirements in 1935, 46.5 per cent in 1934 and 52.9 per cent in 1933. The United States accounted for 48.4 per cent of the 1935 anthracite importations, 51.0 per cent of the 1934 and 47.1 per cent of the 1933. Imports of bituminous coal showed a 7 per cent falling-off to 9,549,457 tons in 1935; the United States supplied 96 per

cent of the year's total, Great Britain approximately 4 per cent, and Norway, Esthonia, Alaska and Poland, the remainder. Lignite coal importations amounted to 5,246 tons and were, as usual, obtained from the United States.

Canadian coal mines furnished employment to 24,831 wage-earners in 1935; the average for the preceding year was 24,671 men. The eastern coal mines employed, on the average, 13,810 men and western coal mines, 11,021 men. Surface employees averaged 244 days' work during the year and underground workers 209 days. There were, in addition to these men, 1,367 salaried employees on the mine payrolls in 1935. Salaries and wages paid to all employees working in or about Canadian coal mines in 1935 amounted to \$26,595,344, as compared with \$25,662,591 in 1934.

Coal made available for consumption in Canada during 1935 totalled 26,469,645 tons; in 1934 Canada's coal supply was 3.2 per cent higher at 27,312,903 tons. These data were computed on the basis of production plus imports less exports.

Canada consumes, in addition to coal, large quantities of coke, natural and artificial gas, fuel oil, wood and electricity for industrial and domestic purposes. In 1935, the Canadian coke supply was estimated at 2,769,881 tons or 12.6 per cent, below the preceding year's total. Sales of coke by Canadian producers amounted to 1,327,163 tons or 67.6 per cent of the year's output. Imports of coke were 42.7 per cent lower in 1935 at 532,926 tons as against 930,221 tons in 1934. Canadian coke and gas manufacturers used 989,154 tons of Canadian bituminous coal and 2,147,189 tons of imported coal in 1935.

The sales of manufactured gas in 1935 were recorded at 15,398,952 thousand cubic feet; in 1934 the total was 15,409,927 thousand cubic feet. Natural gas consumption in 1935 consisted of 16,000,000 thousand cubic feet for domestic purposes and 8,100,000 thousand cubic feet for industrial use. It is estimated that the domestic consumption of natural gas in 1935 resulted in an apparent displacement of 640,000 tons of coal.

Fuel and gas oils consumption in 1935 reached a total of 505.8 million imperial gallons; in the preceding year 503.1 million imperial gallons of fuel and gas oils were available for consumption. The Dominion Fuel Board's survey of fuel oil consumption in Canada showed that 109.1 million imperial gallons were used for domestic and building heating during 1935; 119.6 million imperial gallons for industrial consumption; 34.3 million imperial gallons for tractor fuel; 46.9 million imperial gallons for railroads; and 137.1 million imperial gallons for bunkering purposes. A possible coal displacement of 780,000 tons was indicated by the quantity of fuel oil used for domestic purposes in 1935.

Table 193.—Capital Employed in the Coal Mines of Canada, by Provinces, 1934 and 1935

Province	1934				1935			
	Capital employed as represented by				Capital employed as represented by			
	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	40,360,939	3,008,993	4,293,277	47,663,209	38,576,120	2,852,181	4,707,478	46,135,779
New Brunswick...	1,486,916	28,063	341,413	1,856,392	1,035,803	29,591	263,868	1,329,262
Manitoba.....	2,304		600	2,904	2,200			2,200
Saskatchewan....	4,818,248	123,981	240,473	5,182,702	2,976,292	310,329	282,091	3,568,712
Alberta.....	33,845,242	1,230,576	6,356,058	41,431,876	31,405,166	965,471	6,878,578	39,249,215
British Columbia.	18,994,859	529,293	2,409,651	21,933,803	17,301,611	356,752	2,369,366	20,027,729
Yukon.....	203,000	520		203,520	203,000	620		203,620
Canada.....	99,711,508	4,921,426	13,641,472	118,274,406	91,500,192	4,514,944	14,501,381	110,516,517

Table 194.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1935

Province	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Surface	Under-ground				
						\$	\$	\$
Nova Scotia.....	444	49	2,039	10,635	13,167	830,787	12,071,021	12,901,808
New Brunswick.....	34	7	241	895	1,177	76,918	729,600	806,518
Manitoba.....			3	9	12		2,954	2,954
Saskatchewan.....	43	2	241	572	858	94,889	519,202	614,091
Alberta.....	549	35	2,057	5,605	8,246	1,141,398	7,891,362	9,032,760
British Columbia.....	188	16	786	1,745	2,735	422,734	2,813,429	3,236,163
Yukon.....			1	2	3		1,050	1,050
Canada.....	1,258	109	5,368	19,463	26,198	2,566,726	24,028,618	26,595,344

Table 195.—Wage-earners Employed in the Coal Mines of Canada, by Classes and by Provinces, 1935, with Comparative Totals for 1934

Classification	Province							Canada		
	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Surface	Under-ground	Total
Administration.....	56	19		10	61	8		154		154
Officials, foremen and clerks.....	778	34		59	597	147	1	506	1,110	1,616
Screenmen and loaders.....	641	52	2	53	635	129	1	1,513		1,513
Stripping shovel operators.....				5	6			11		11
Hand cutters and helpers.....	770	506	8	370	1,875	409	1		3,939	3,939
Machine cutters and helpers.....	1,074	62		26	320	136			1,618	1,618
Machine loaders and helpers.....	2,107	150		44	1,492	309			4,102	4,102
Horse haulage employees.....	415	3		57	403	153		57	974	1,031
Mechanical haulage employees.....	1,515	2		23	329	228		114	1,983	2,097
Ventilation employees.....	244			3	61	21		1	328	329
Roadmakers.....	294	19		14	128	29		6	478	484
Timbermen.....	1,095	34	1	10	232	104		10	1,466	1,476
Pumpmen.....	90	7		5	43	7		7	145	152
Loading shovel.....				9				9		9
Cleaning shovel.....										
Chute loaders.....	87				160	10			257	257
Enginemen.....	252	19	1	12	132	56		384	88	472
Firemen.....	137	2		12	93	35		279		279
Machineists.....	192	1		8	65	44		296	14	310
Carpenters and masons.....	114	5		5	46	44		213	1	214
Other mechanics.....	328	2		4	101	155		260	330	590
Japanese.....						3		1	2	3
Chinese.....						97		97		97
Indians.....										
All other employees.....	2,485	219		84	883	407		1,450	2,628	4,078
Total for 1935.....	12,674	1,136	12	813	7,662	2,531	3	5,368	19,463	24,831
Total for 1934.....	12,051	1,035	12	882	7,839	2,849	3	5,426	19,245	24,671

Table 196.—Output of Coal from Canadian Mines, 1926-1935

Year	Short tons	Value	Average per ton
		\$	\$
1926.....	16,478,131	59,875,094	3.63
1927.....	17,426,861	61,867,463	3.55
1928.....	17,564,293	63,757,833	3.66
1929.....	17,496,557	63,065,170	3.60
1930.....	14,881,324	52,849,748	3.55
1931.....	12,243,211	41,207,682	3.37
1932.....	11,738,913	37,117,695	3.16
1933.....	11,903,344	35,923,962	3.02
1934.....	13,810,193	42,045,942	3.04
1935.....	13,888,006	41,963,110	3.02

Table 197.—Output and Value of Coal in Canada, by Kinds and by Provinces, 1934 and 1935

(Short tons)

Province	1934			1935		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	37	6,341,625	21,860,093	39	5,822,075	20,391,227
NEW BRUNSWICK (Bituminous).....	25	314,750	1,026,343	22	346,024	1,129,019
MANITOBA (Lignite).....	3	4,113	8,952	2	3,106	7,408
SASKATCHEWAN (Lignite).....	*132	909,288	1,241,130	*158	921,785	1,293,668
ALBERTA—						
Bituminous.....	16	1,915,800	6,616,513	16	2,248,620	6,583,542
Sub-bituminous.....	19	537,508	1,256,936	19	566,425	1,410,926
Lignite.....	†280	2,300,502	5,182,650	†278	2,647,849	6,100,327
Total.....	315	4,753,810	12,556,099	313	5,462,894	14,094,795
BRITISH COLUMBIA (Bituminous).....	21	1,485,969	5,351,108	21	1,331,287	5,043,510
YUKON (Bituminous).....	1	638	2,217	1	835	3,483
Canada—						
Bituminous.....	100	10,058,782	34,356,274	99	9,748,841	33,150,781
Sub-bituminous.....	19	537,508	1,256,936	19	566,425	1,410,926
Lignite.....	415	3,213,903	6,432,732	438	3,572,740	7,401,403
Total.....	534	13,810,193	42,045,942	556	13,888,006	41,963,110

* Exclusive of 92 small mines in operation during part of 1934 and 35 small mines operating during part of 1935.

† Exclusive of 33 small mines operated under special permits in 1934 and 8 small mines in 1935.

Table 198.—Disposition of Coal from Canadian Mines, 1934 and 1935

	1934			1935		
	Total coal	Total value	Average value per ton	Total coal	Total value	Average value per ton
	Tons	\$	\$	Tons	\$	\$
Supplied to employees for domestic consumption.....	167,005	472,549	2.83	184,891	540,651	2.92
Used for power purposes—						
(a) Shops.....	84,748	291,208	3.44	89,879	302,549	3.37
(b) Colliery boilers.....	569,430	1,513,119	2.66	553,279	1,458,243	2.64
(c) Companies' railroads.....	68,604	250,300	3.65	62,440	228,651	3.66
(d) Harbour tugs and dredges.....				353	790	2.24
Shipped. (See Table 200)—						
(a) Ships' bunkers.....	340,483			427,850		
(b) Railroads.....	3,178,701	38,921,745	3.11	3,891,002	39,205,653	3.09
(c) Other.....	8,986,780			8,357,507		
Used in making coke at colliery.....	131,962	368,203	2.79	139,872	317,533	2.27
Used in making briquettes.....	15,028	48,323	3.22	17,621	57,012	3.23
Put on bank.....	866,819	2,955,933	3.41	1,347,492	4,497,534	3.34
Put on waste heap.....	230,311			204,182		
Total disposition.....	14,639,871	44,821,380	3.06	15,276,368	46,608,616	3.05
Lifted from bank.....	814,880	2,775,438	3.41	1,383,079	4,645,506	3.36
Lifted from waste heap.....	14,798			5,283		
Total output.....	13,810,193	42,045,942	3.04	13,888,006	41,963,110	3.02

Table 199.—Disposition of Coal from Canadian Mines, by Provinces, 1935

(Short tons)

	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Canada
Supplied to employees for domestic consumption.....	121,370	3,858		3,220	39,539	16,900	4	184,891
Coal shipped. (See Table 200)...	5,303,780	338,514	2,986	879,554	5,035,347	1,115,868	310	12,676,359
Used under colliery boilers, etc...	260,452	1,741	120	23,656	163,154	104,139	17	553,279
Used by companies' railroads.....	42,648	900		7,721	7,847	3,324		62,440
Used for manufacture of coke at colliery.....					98,233	41,639		139,872
Used in making briquettes.....				130	17,491			17,621
Used in shops, etc.....	89,879							89,879
Used by harbour tugs and dredges.....		353						353
Put on bank.....	1,207,590	17,449		4,675	68,791	48,843	144	1,347,492
Put on waste heap.....	38,237	707		8,546	90,315	65,905	472	204,182
Total disposition.....	7,064,309	363,169	3,106	927,502	5,520,717	1,396,618	947	15,276,368
Lifted from bank.....	1,241,585	17,060		5,357	53,665	65,300	112	1,383,079
Lifted from waste heap.....	649	85		360	4,158	31		5,283
Total output.....	5,822,075	346,024	3,106	921,785	5,462,894	1,331,287	835	13,888,006

Table 200.—Shipments of Coal from Canadian Mines, by Grades and Destinations, 1934 and 1935

(Short tons)

Destination	1934				1935					
	Run-of-mine	Screened	Slack	Total	Run-of-mine	Cobble	Lump	Nut and other grades	Slack	Total
Prince Edward Island.....	5,748	59,670	10,270	75,688	10,288		50,834		10,172	71,294
Nova Scotia.....	124,542	418,916	625,418	1,168,876	144,045		353,668		756,307	1,254,020
New Brunswick.....	135,069	117,653	249,606	502,328	110,675		85,345		270,407	466,427
Quebec.....	121,709	1,308,956	1,453,944	2,884,609	16,483		546,103		1,196,752	1,759,338
Ontario.....	5,273	53,025	20,613	78,911	490	220	55,013	10,075	20,359	86,157
Manitoba.....	70,541	304,460	499,551	874,552	75,286	74,314	235,078	218,358	340,914	943,950
Saskatchewan.....	239,046	721,074	511,582	1,471,702	223,887	89,170	723,996	344,305	219,374	1,600,732
Alberta.....	190,133	393,206	480,629	1,063,968	193,931		477,630	292,374	252,173	1,216,158
British Columbia.....	18,095	465,149	167,133	650,377	18,158		414,899	114,446	141,055	688,558
Yukon.....		191		191				310		310
Northwest Territories.....		31		31						
Total domestic shipments.....	910,156	3,842,331	4,018,746	8,771,233	793,293	163,704	2,942,566	979,868	3,207,513	8,086,944
Railroads—										
In Canada.....	2,466,488	608,467	93,655	3,168,610	2,588,061	621	1,135,952	21,552	116,936	3,863,122
In United States.....	10,564		54	10,618	10,571					10,571
In Newfoundland.....							17,309			17,309
Ship's bunkers.....	234,910	105,441	330	340,681	275,189		135,781	15,056	1,824	427,850
Total railroads and ship's bunkers.....	2,711,962	713,908	94,039	3,519,909	2,873,821	621	1,289,042	36,608	118,760	4,318,852
United States.....	2,735	21,136	53,506	77,377	5,368		25,295	14,126	74,415	119,204
Alaska.....		15,290		15,290			14,995	318		15,213
Newfoundland.....	4,116	115,697	120	119,933	12,922		108,969		9	121,900
Other countries.....		2,222		2,222	125		7,401			7,526
Lost at sea.....							6,720			6,720
Total external shipments.....	6,851	154,345	53,626	214,822	18,415		163,280	14,444	74,424	270,563
Total.....	3,628,969	4,710,584	4,166,411	12,505,964	3,685,529	164,325	4,394,888	1,030,920	3,400,697	12,676,359

Table 201.—Imports of Anthracite and Bituminous Coal into Canada from Great Britain, by Grades and by Provinces, 1934 and 1935

(Short tons)

Destination	1934				1935			
	Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
	Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.		Grate, egg, stove, nut, and pea	Screenings or dust	N.O.P.	
Prince Edward Island..	9,557			1,992	3,400			4,142
Nova Scotia.....	54,623		339	51,719	49,477		592	54,506
New Brunswick.....	78,700		434	12,789	49,249			22,809
Quebec.....	1,427,677	31,077	8,662	263,357	1,234,266	55,266	30,665	296,281
Central Ontario.....	32,165				29,657			860
Head of Lakes.....								
Manitoba.....				1,506	11		370	931
Saskatchewan.....				112				
British Columbia.....			282	42			1,568	1,116
Canada.....	1,602,722	31,077	9,717	331,517	1,366,060	55,266	33,195	380,645

Table 202.—Imports of Anthracite, Bituminous and Lignite Coal into Canada from the United States, by Grades and by Provinces, 1934 and 1935

(Short tons)

Destination	1934					1935				
	Anthracite			Bitu- minous, all grades	Lignite	Anthracite			Bitu- minous, all grades	Lignite
	Grate egg, stove, nut, and pea	Screen- ings or dust	N.O.P.			Grate, egg, stove, nut, and pea	Screen- ings or dust	N.O.P.		
Prince Edward Island....	1,153			99		1,454			125	
Nova Scotia.....	11,677			678		7,370			48	
New Brunswick.....	22,513		103	23,020		18,885		86	11,989	
Quebec.....	293,092	8,997	106,826	659,566		247,005	7,951	61,606	459,761	
Ontario.....	1,206,051	4,172	143,457	9,238,409		1,208,188	3,193	108,795	8,682,867	
Manitoba.....	388		5,698	10,597	253			4,754	8,987	396
Saskatchewan.....				1,123	42			717	952	182
Alberta.....				1,302	10				1,136	39
British Columbia.....				1,928	2,486				2,543	4,629
Yukon.....				37					20	
Canada.....	1,534,874	13,169	256,084	9,936,759	2,791	1,483,619	11,144	175,322	9,168,428	5,246

Table 203.—Imports of Anthracite and Bituminous Coal into Canada from Other Countries, by Provinces, 1934 and 1935

(Short tons)

Destination	Source	1934				1935			
		Anthracite			Bitu- minous, all grades	Anthracite			Bitu- minous, all grades
		Grate, egg, stove, nut and pea	Screen- ings or dust	N.O.P.		Grate, egg, stove, nut and pea	Screen- ings or dust	N.O.P.	
Prince Edward Island.....	Newfoundland..				24				
Nova Scotia.....	Germany.....					3,366			
Quebec.....	Germany.....	72,103			50	201,679			
	Belgium.....	17,557				67,220			
	Norway.....				280				285
	Sweden.....				15				
	French Indo- China.....					24,687			
	Esthonia.....								55
	Newfoundland..	6							
	Poland.....								1
Central Ontario.....	French Indo- China.....					29,760			
British Columbia.....	Alaska.....								43
	China.....								
	Japan.....				300				
Canada.....		89,666			669	326,712			384

Table 204.—Average Imports of Coal into Canada, by Kinds and by Provinces, for the Five Years, 1931-1935

(Short tons)

Destination	Anthracite			Total bituminous	Total lignite	Total all grades
	Grate, egg, stove, nut and pea	Other	Total			
Prince Edward Island.....	6,064	674	6,738	3,862		10,600
Nova Scotia.....	58,583	205	58,788	52,151		110,939
New Brunswick.....	91,240	523	91,763	31,032		122,795
Quebec.....	1,600,937	143,448	1,744,385	810,554		2,554,939
Central Ontario.....	1,225,505	123,195	1,348,700	7,839,860		9,188,560
Head of Lakes.....	8,747	2,675	11,422	666,820		678,242
Total Ontario.....	1,234,252	125,870	1,360,122	8,506,680		9,866,802
Manitoba.....	1,827	3,193	5,020	10,915	220	16,155
Manitoba and Head of Lakes.....	10,574	5,868	16,442	677,735	220	694,397
Saskatchewan.....		21	21	1,302	116	1,439
Alberta.....		15	15	1,036	10	1,061
British Columbia.....		1,255	1,255	7,583	3,686	12,524
Yukon.....				16		16
Canada.....	2,992,903	275,204	3,268,107	9,425,131	4,032	12,697,270

Table 205.—Exports of Canadian Coal, by Destinations, 1933-1935

(Compiled in the *External Trade Branch*)

Destination	1933		1934		1935	
	Short tons	Value	Short tons	Value	Short tons	Value
BRITISH EMPIRE		\$		\$		\$
United Kingdom.....	8,918	50,585	21,158	112,653	35,413	206,996
Irish Free State.....	1,753	9,072	1,865	9,437	1,837	9,224
British South Africa.....	5,403	29,466	6,989	34,102	3,832	18,597
Bermuda.....	35	262	1,094	5,223	804	3,934
British Guiana.....					2,193	10,243
British West Indies—						
Barbadoes.....			1,235	5,623		
Jamaica.....	282	2,115	200	1,500		
Trinidad and Tobago.....			970	4,553	1,079	5,395
Other British West Indies.....			1,184	5,516		
Newfoundland.....	79,995	389,032	102,544	470,969	128,169	577,241
Sierra Leone.....			1,111	5,187	4,583	22,296
Australia.....	23,759	152,082	22,126	135,220	15,891	95,666
New Zealand.....	2,116	11,109	5,004	22,518	13,320	62,338
Total British Empire.....	122,261	643,723	165,480	812,501	207,121	1,011,930
FOREIGN COUNTRIES						
Argentina.....					5,559	26,584
Belgium.....	1,038	5,814	2,415	11,849	2,433	12,216
Brazil.....	822	4,521			1,420	6,765
Chile.....			994	4,647		
China.....	308	2,006	834	4,916	3,473	25,395
Cuba.....	443	2,497	1,896	8,890	2,527	12,203
Denmark.....					1,308	6,453
France.....	1,463	8,173	5,150	25,976	4,699	24,207
French Possessions—						
French Africa.....					123	615
St. Pierre and Miquelon.....	2,727	13,374	1,325	7,241	4,448	19,298
Germany.....	123	673				
Greece.....					314	1,570
Italy.....	84	630			2,800	14,165
Japan.....	3,765	16,780	1,614	7,458	982	7,365
Netherlands.....	891	3,932	2,394	11,739	1,713	8,394
Norway.....					2,689	12,534
Panama.....			1,063	4,784		
Peru.....					252	1,259
Poland and Danzig.....			305	1,449	424	2,120
Portuguese Africa.....						
Russia (U.S.S.R.).....	1,448	7,964				
San Domingo.....			2,400	18,000		
Spain.....			297	1,473	623	2,991
Sweden.....	406	2,233	199	995	267	1,330
United States.....	108,263	375,150	107,162	396,728	161,804	611,990
Alaska.....	14,583	96,710	12,622	81,407	12,889	94,656
Puerto Rico.....	608	4,045			243	1,215
Total foreign countries.....	136,972	544,502	140,855	588,477	211,270	894,717
Total.....	259,233	1,188,225	306,335	1,400,978	418,391	1,906,647

Table 206.—Annual Consumption of Coal in Canada, 1926-1935

Calendar year	Canadian*		Imported coal "entered for consumption"				Total	Per capita
			From U.S.A.	From Great Britain	Total†			
	Short tons	%	Short tons	Short tons	Short tons	%	Short tons	
1926.....	15,086,296	47.7	16,204,405	287,299	16,565,555	52.3	31,651,851	3.349
1927.....	15,944,983	46.7	17,266,434	907,220	18,177,303	53.3	34,122,286	3.541
1928.....	16,487,807	50.0	15,830,688	682,755	16,515,582	50.0	33,003,389	3.356
1929.....	16,387,461	48.0	16,780,452	843,502	17,724,132	52.0	34,111,593	3.401
1930.....	14,052,671	43.3	16,971,933	1,144,861	18,412,039	56.7	32,464,710	3.180
1931.....	11,682,779	47.7	11,793,798	987,442	12,828,327	52.3	24,511,106	2.362
1932.....	11,212,701	49.0	9,889,866	1,727,716	11,654,492	51.0	22,867,193	2.177
1933.....	11,456,273	51.5	8,865,935	1,942,875	10,808,962	48.5	22,265,235	2.085
1934.....	13,236,406	51.1	10,580,710	1,981,116	12,651,168	48.9	25,887,574	2.392
1935.....	13,306,303	53.1	9,618,518	1,822,500	11,735,835	46.9	25,042,138	2.287

* The sum of Canadian coal mine sales, colliery consumption, coal supplied to employees, and coal used in making coke, etc., less the tonnage of coal exported.

† Includes small tonnages from countries other than Great Britain and the United States. Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ship's stores.

Table 207.—Summary Statistics for 1935—Output, Exports, Interprovincial Shipments, Imports* and Coal made Available for Consumption in Canada, by Provinces

(Short tons)

Province	Canadian coal				Im-ported from U.S.A	Im-ported from Great Britain	Im-ported from Germany	Im-ported from Belgium	Im-ported from French Indo-China	Im-ported from other countries	Coal available for consumption
	Output	Re-ceived from other prov.	Shipped to other prov.	Ex-ported							
PRINCE EDWARD ISLAND—											
Anthracite.....					1,454	3,400					4,854
Bituminous.....		88,998		100	125	4,142					93,165
Total.....		88,998		100	1,579	7,542					98,019
NOVA SCOTIA—											
Anthracite.....					7,370	50,069	3,366				60,805
Bituminous.....	5,822,075	68	3,232,908	232,597	48	54,506					2,411,192
Total.....	5,822,075	68	3,232,908	232,597	7,418	104,575	3,366				2,471,997
NEW BRUNSWICK—											
Anthracite.....					18,971	49,249					68,220
Bituminous.....	346,024	497,914	16,200	62,130	11,989	22,809					800,406
Total.....	346,024	497,914	16,200	62,130	30,960	72,058					868,626
QUEBEC—											
Anthracite.....					316,562	1,320,197	201,679	67,220	24,687		1,930,345
Bituminous.....		2,656,674	920,970	77	459,761	296,281				341	2,492,010
Sub-bituminous..											
Total.....		2,656,674	920,970	77	776,323	1,616,478	201,679	67,220	24,687	341	4,422,355
CENTRAL ONTARIO—											
Anthracite.....					1,310,721	29,657			29,760		1,370,138
Bituminous.....	944,098			108	8,085,024	860					9,029,874
Sub-bituminous..	123,961										23,961
Lignite.....	142,068										42,068
Total.....	1,010,127			108	9,395,745	30,517			29,760		10,466,041
MANITOBA AND HEAD OF LAKES—											
Anthracite.....					14,926	381					15,307
Bituminous.....		232,328		213	606,830	931					839,876
Sub-bituminous..		69,372									69,372
Lignite.....	3,106	639,264		390	396						642,376
Total.....	3,106	940,964		603	662,152	1,312					1,566,931

* Direct Imports into Ontario. See text for trans-shipments from Quebec.

† Nova Scotia coal. ‡ Shipments to any point in Ontario from western mines.

Table 207.—Summary Statistics for 1935—Output, Exports, Interprovincial Shipments, Imports* and Coal made Available for Consumption in Canada, by Provinces
Concluded
 (Short tons)

Province	Canadian coal				Im- ported from U.S.A	Im- ported from Great Britain	Im- ported from Ger- many	Im- ported from Bel- gium	Im- ported from French Indo- China	Im- ported from other coun- tries	Coal available for con- sumption
	Output	Re- ceived from other prov.	Shipped to other prov.	Ex- ported							
SASKATCHEWAN—											
Anthracite.....					49						49
Bituminous.....		68,754		263	952						69,443
Sub-bituminous..		16,005									16,005
Lignite.....	921,785	1,049,298	408,836	3,130	182						1,559,299
Total....	921,785	1,134,057	408,836	3,393	1,183						1,644,796
ALBERTA—											
Anthracite.....											
Bituminous.....	2,248,620	11,261	303,462	438	1,136						1,957,117
Sub-bituminous..	566,425		149,065								417,360
Lignite.....	2,647,849		1,392,657	1,110	39						1,254,121
Total....	5,462,894	11,261	1,845,184	1,548	1,175						3,628,598
BRITISH COLUMBIA—											
Anthracite.....					32	1,568					1,600
Bituminous.....	1,331,287	104,060	130,615	111,822	2,543	1,116				43	1,196,612
Sub-bituminous..		39,727									39,727
Lignite.....		70,863		5,985	4,629						69,507
Total....	1,331,287	214,650	130,615	117,807	7,204	2,684				43	1,307,446
YUKON—											
Bituminous.....	835			28	20						827
Total....	835			28	20						827
CANADA—											
Anthracite.....					1,670,085	1,454,521	205,045	67,220	54,447		3,451,318
Bituminous.....	9,748,841	4,604,155	4,604,155	407,776	9,168,428	380,645				384	18,890,522
Sub-bituminous..	566,425	149,065	149,065								566,425
Lignite.....	3,572,740	1,801,493	1,801,493	10,615	5,246						3,567,371
Total....	13,888,066	6,554,713	6,554,713	418,391	10,843,759	1,835,166	205,045	67,220	54,447	384	26,475,636

Table 208.—World Production of Coal* 1931-1935

(Including brown coal)

(Long tons)

Country	1931	1932	1933	1934	1935
BRITISH EMPIRE					
Great Britain—					
Anthracite.....	5,829,175	6,616,972	7,053,043	7,126,733	6,798,415
Bituminous.....	213,629,776	202,116,168	200,059,200	213,600,955	215,454,037
Irish Free State—					
Anthracite.....	73,393	64,506	86,246	89,731	85,738
Semi-bituminous..	18,347	16,674	19,041	21,343	26,985
Nigeria.....	327,681	252,485	235,133	259,754	257,819
Southern Rhodesia.	577,983	431,183	476,340	632,790	683,654
Union of South Africa	10,709,114	9,764,425	10,545,197	12,002,100	13,359,508
Canada—					
Bituminous.....	7,911,929	6,887,749	7,124,360	8,981,055	8,687,189
Sub-bituminous..	420,842	500,805	494,748	479,918	505,737
Lignite.....	2,598,668	3,092,618	3,008,878	2,869,556	3,186,161
British Borneo—					
State of North Borneo.....	28,926	168	78	28	†
Brunei.....	18,213			†	838
Federated Malay States.....	402,355	277,848	218,247	321,461	377,441
India—					
Gondwana Coalfields.....	21,331,872	19,814,524	19,456,254	21,691,404	23,016,695
Tertiary Coalfields.....	384,563	358,863	332,909	366,043	
Used by miners.....	543,000	504,000	495,000	551,000	†
Australia—					
Bituminous.....	8,401,260	8,585,858	9,091,976	9,579,033	10,887,954
Lignite.....	2,194,453	2,612,512	2,580,060	2,617,534	2,221,515
New Zealand—					
Bituminous.....	979,636	928,234	843,845	831,702	825,227
Brown coal.....	1,069,749	806,397	860,238	1,103,968	1,170,805
Lignite.....	108,371	107,391	117,175	124,645	119,152
Total British Empire.....	278,000,000	264,000,000	263,000,000	283,000,000	288,000,000

Table 208.—World Production of Coal* 1931-1935—Continued

(Including brown coal)

(Long tons)

Country	1931	1932	1933	1934	1935
FOREIGN COUNTRIES					
Albania—					
Lignite.....	3,109	†	†	†	†
Austria—					
Bituminous.....	224,541	217,819	235,150	246,861	256,484
Brown coal.....	2,934,978	3,055,021	2,966,862	2,805,905	2,923,765
Belgium—					
Anthracite and semi-anthracite.....	5,865,653	4,656,753	5,246,607	5,731,792	26,087,050
Bituminous.....	20,749,689	16,428,442	19,653,598	20,240,618	
Bulgaria—					
Anthracite.....	6,117	3,075	3,465	6,812	1,632,744
Bituminous.....	78,161	93,758	75,184	70,731	
Brown coal.....	1,414,217	1,636,501	1,469,896	1,543,192	
Czechoslovakia—					
Bituminous.....	12,895,773	10,787,907	10,365,655	10,518,684	10,791,957
Brown coal.....	17,648,430	15,607,935	14,825,194	14,932,486	14,976,663
France—					
Saar.....	11,187,485	10,273,195	10,394,373	11,138,953 (e)	1,673,228
Other districts—					
Anthracite and bituminous (a).....	49,220,890	45,535,513	46,146,465	46,879,876	46,362,840
Lignite.....	1,018,575	975,695	1,076,417	1,009,284	885,279
Germany—					
Bituminous.....	116,766,357	103,086,309	107,959,643	122,884,578	140,744,275
Brown coal.....	131,205,263	120,709,596	124,791,923	135,105,863	145,027,633
Greece—					
Lignite.....	103,546	135,410	97,496	102,547	†
Hungary—					
Bituminous.....	764,150	880,674	787,418	744,316	809,825
Brown coal.....	5,650,352	5,393,595	5,393,595	5,661,394	6,146,993
Lignite.....	364,451	442,726	420,348	420,101	464,588
Lignite (anhydrous).....	†	115,203	115,310	113,526	118,992
Italy—					
Anthracite.....	15,331	47,004	66,644	83,212	69,042
Bituminous.....	216,640	204,390	262,439	284,481	366,477
Brown coal.....	358,730	370,107	376,712	402,162	536,867
Yugoslavia—					
Bituminous.....	399,914	362,187	377,432	381,099	393,624
Brown coal.....	3,467,492	3,030,987	2,806,202	2,944,406	3,034,480
Lignite.....	1,040,425	1,010,853	905,274	921,391	936,659
Netherlands—					
Bituminous.....	12,697,631	12,554,978	12,375,372	12,145,975	11,690,250
Brown coal.....	120,269	122,115	95,511	91,032	84,843
Poland—					
Bituminous.....	37,660,667	28,379,163	26,924,235	28,771,390	28,091,945
Brown coal.....	38,800	32,900	32,963	25,986	18,170
Portugal—					
Anthracite.....	223,475	187,632	205,399	195,906	202,139
Bituminous.....		49,753	19,426	3,652	5,390
Brown coal.....		16,043	11,291	14,835	19,476
Roumania—					
Anthracite.....		12,052	17,777	17,726	16,935
Bituminous.....	282,005	172,992	173,986	207,004	256,962
Lignite.....	1,606,088	1,440,807	1,292,878	1,598,211	1,624,100
Russia—					
Anthracite.....	55,737,000	63,299,000	74,730,000	92,456,000	102,177,000
Bituminous—					
European.....					
Asiatic.....					
Brown coal.....					
Spain—					
Anthracite.....	516,402	539,110	563,399	634,440	690,000
Bituminous.....	6,462,526	6,206,607	5,340,855	5,203,891	6,214,994
Brown coal.....	336,073	330,981	296,260	293,926	299,028
Spitzbergen and Bear Island.....	239,267	261,500	419,367	524,393	648,608
Sweden.....	337,777	327,816	343,410	408,668	416,813
Switzerland (b).....	4,000	4,000	4,000	3,000	4,000
Algeria.....	25,186	24,584	29,948	33,465	37,316
Belgian Congo.....	84,359	17,000	413	4,622	11,136
Morocco (French)—					
Anthracite.....	5,574	14,724	27,275	35,484	51,864
Mozambique.....	†	19,430	15,600	21,524	15,250
Greenland.....	4,600	†	6,000	6,000	6,000
Mexico.....	907,723	642,314	636,622	769,805	1,124,847
United States—					
Anthracite.....	53,255,046	44,513,590	44,233,343	51,043,117	45,538,393
Bituminous and lignite.....	341,151,246	276,526,671	297,884,404	320,864,305	329,754,000
Brazil.....	454,061	499,170	624,442	697,071	744,998
Chile.....	1,083,004	1,063,027	1,513,770	1,778,979	1,860,928
Colombia (estimated).....	200,000	200,000	200,000	200,000	200,000

Table 208.—World Production of Coal* 1931-1935—Concluded

(Including brown coal)

(Long tons)

Country	1931	1932	1933	1934	1935
Peru—					
Anthracite.....	138,332	2,016	2,639	3,543	30,000
Bituminous.....		23,400	26,961	31,220	
Venezuela (c).....	3,000	4,644	4,862	6,000	†
China (d).....	17,741,573	18,370,000	18,505,000	20,568,000	12,000,000
Dutch East Indies.....	2,382,223	1,033,639	1,018,881	1,015,442	1,093,437
Formosa.....	1,399,093	1,335,595	1,333,701	1,355,000	†
French Indo-China—					
Anthracite.....	1,650,000	1,640,637	1,517,861	1,530,025	1,713,100
Bituminous.....	28,000	22,328	25,508	36,620	33,400
Brown coal.....	23,000	23,091	22,644		
Japan—					
Semi-anthracite.....	27,545,251	27,610,311	32,010,079	35,357,604	34,353,545
Bituminous.....					
Brown coal.....	115,881	106,818	113,958	122,815	†
Karafuto.....	627,886	666,691	874,874	1,177,748	†
Korea—					
Anthracite.....	904,000	1,086,755	729,511	966,855	1,987,579
Bituminous.....			556,585	695,122	
"Manchoukuo".....	8,984,200	7,992,000	9,425,426	11,640,768	†
Philippine Islands.....	18,668	18,184	15,668	†	†
Turkey in Asia—					
Bituminous.....	1,549,230	1,568,411	1,822,856	2,252,129	2,303,526
Lignite.....	7,652	13,346	29,094	51,943	72,196
Total Foreign countries.....	960,000,000	850,000,000	890,000,000	980,000,000	1,000,000,000
Grand Total.....	1,240,000,000	1,110,000,000	1,150,000,000	1,260,000,000	1,290,000,000

*Data obtained from *The Mineral Industry of the British Empire and Foreign Countries*.

† Information not available.

(a) Includes about 5,900,000 tons of anthracite each year.

(b) United States Bureau of Mines estimate.

(c) Excluding production in government owned mines.

(d) Of which about 3,000,000 tons are anthracite and 300,000 tons are lignite.

(e) January to February 17th only, after which date production is included with that of Germany.

THE COKE AND ARTIFICIAL GAS INDUSTRY

The output of gas-house, by-product and beehive coke in Canada during 1935 totalled 2,257,604 tons valued at \$15,861,159 as compared with 2,243,420 tons at \$15,861,757 in 1934. By-product and beehive oven plants produced 1,962,844 tons during 1935; only 294,760 tons were obtained from city gas plants. In addition, 72,191 tons of petroleum coke were recovered as a by-product in petroleum refining; this production is not included in the coke figures given for the coke and gas industry.

By-product coke ovens produced 27,053,803 thousand cubic feet of artificial gas in 1935 and gas plants produced 12,667,207 thousand cubic feet.

Sales of gas by the producers totalled 15,398,952 thousand cubic feet valued at \$15,358,572 of which 8,227,793 thousand cubic feet valued at \$7,583,984 was from by-product plants and 7,171,159 thousand cubic feet at \$7,774,588 from gas works. Most of the remaining gas was used as a fuel in the producing plants or their associated metallurgical works. In addition to the above, 5,154,885 thousand cubic feet of still gas was produced as a by-product from petroleum refineries, practically all of which was used for fuel purposes in the refineries.

Imports of gas-house and by-product coke dropped to 532,926 tons in 1935 from 930,221 tons in 1934, but exports during the same period increased to 20,649 tons from 7,396 tons. Gas entering Canada by pipe line amounted to 106,401 thousand cubic feet as against 107,171 thousand cubic feet in the previous year.

The number of customers served by the producers of illuminating and fuel gas in 1935 was 487,733. The length of distributing mains was 3,881 lineal miles or 6,957 miles in terms of 3 inch mains. The calorific value of the gas sold ranged from 450 to 550 B.T.U. per cubic foot.

Table 209.—Materials used in the Coke and Gas Industry in Canada, 1933-1935

Materials	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Bituminous coal:—						
Canadian..... tons	604,017	2,491,991	844,303	3,459,633	989,154	4,129,750
Foreign..... tons	1,861,944	8,405,030	2,271,801	10,270,998	2,147,189	9,641,302
Coke for gas-making:—						
Purchased..... tons	4,614	43,343	4,457	42,596	4,372	39,082
Companies' own make..... tons	108,654	732,662	77,255	530,351	72,833	510,895
Oil used for enriching water gas..... imp. gal.	9,558,945	610,147	6,140,084	355,933	4,532,573	325,365
Oil used for making oil gas..... imp. gal.	756,410	56,546	866,905	68,424	683,365	56,984
Absorbing and wash oil..... imp. gal.	261,583	33,796	182,417	25,080	191,004	20,338
Caustic soda..... lb.	384,452	12,643	678,006	19,515	711,051	18,948
Calcium carbide..... lb.	28,000	1,236				
Lime..... tons	1,374	8,784	1,911	11,686	2,375	13,712
Water.....		15,672		33,484		18,954
Oxide or purifying materials..... tons	2,734	29,076	3,757	47,010	3,701	46,204
Sulphuric acid 66° Bé..... lb.	28,905,528	187,420	33,907,546	238,148	40,775,289	280,070
All other materials.....		100,729		134,153		131,906
Total cost.....		12,729,075		15,237,031		15,233,519

Table 210.—Production in Canada, Imports and Exports of Coke and Its By-Products, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Coke						
PRODUCTION—by provinces—						
Nova Scotia, New Brunswick and Quebec..... tons	445,755	2,840,433	654,305	4,369,150	730,469	4,738,191
Ontario..... tons	1,153,509	8,429,660	1,388,709	10,200,363	1,334,081	9,868,953
Manitoba, Alberta and British Columbia..... tons	172,900	1,196,102	200,406	1,292,244	193,054	1,254,015
Total..... tons	1,772,164	12,466,195	2,243,420	15,861,757	2,257,604	15,861,159
IMPORTS..... tons	644,075		934,833		532,926	
EXPORTS..... tons	5,199	36,381	7,396	45,390	20,649	124,785
AVAILABLE FOR CONSUMPTION..... tons	2,411,040		3,170,857		2,769,881	
Other Products						
PRODUCTION—						
Ammonium sulphate..... tons	16,723	318,973	20,512	413,729	24,452	637,353
Gas: (a) Sales..... M cu. ft.	15,893,248	11,839,345	15,409,927	15,766,750	15,398,952	15,358,572
(b) Used in own plants..... M cu. ft.	7,166,473	1,668,524	13,636,957	1,753,926	13,329,088	1,660,389
(c) Used in associated metallurgical works..... M cu. ft.	6,314,165	908,697	8,542,290	1,163,000	9,155,263	1,191,270
(d) Gas otherwise accounted for, but not sold..... M cu. ft.	133,329	46,619	836,962	294,718	526,651	262,956
(e) Not accounted for..... M cu. ft.	844,069	881,654	970,684	876,824	1,425,893	1,330,013
Benzol..... imp. gal.	2,645,649	552,595	3,412,864	621,799	2,986,016	610,304
Light oils..... imp. gal.	57,925	61,250	588,581	96,347	1,561,712	227,286
Tar..... imp. gal.	21,292,622	1,172,797	25,840,781	1,397,413	25,686,490	1,312,455
Ammonia liquor..... pound N.H ₃	1,607,326	18,729	1,981,728	23,371	1,884,390	21,127
All other products.....		1,597		2,386		1,905
IMPORTS—						
Ammonium sulphate..... tons	4,156	100,415	11,046	245,372	4,280	94,222
Coal tar and pitch.....		42,663		80,063		137,804
EXPORTS—						
Ammonium sulphate..... tons	62,383	1,081,392	57,704	1,144,164	45,055	977,552
Coal tar and pitch..... gal.	8,513,031	495,999	6,745,866	390,751	4,242,867	202,282

THE NATURAL GAS INDUSTRY

The Canadian production of natural gas in 1935 advanced to 24,910,786 thousand cubic feet worth \$9,363,141 from the 1934 total of 23,162,324 thousand cubic feet valued at \$8,759,652.

Alberta continued to be the leading producing province with an output of 16,060,349 thousand cubic feet; Ontario came next with 8,158,825 thousand cubic feet; New Brunswick followed with 615,454 thousand cubic feet and the Lloydminster well in Saskatchewan produced 75,558 thousand cubic feet. There was, as usual, a small output from several private wells in Manitoba.

New Brunswick's production in 1935 was obtained from wells in the Stony Creek field, near Moncton. The gas from this field was piped to Moncton and Hillsboro where approximately 5,500 consumers were served. Thirty-five natural gas wells were active in New Brunswick at the end of 1935.

Ontario produced 8,158,825 thousand cubic feet in 1935 or 6.2 per cent above the preceding year's total of 7,682,851 thousand cubic feet.

Col. R. B. Harkness, Commissioner of Gas for Ontario, refers to developments in this province in 1935, as follows:

"The Dover field is second in average open flow and has established a record in 1935 of 2 dry wells to 10 producing wells as against that in 1929 of 7 dry wells and 1 producing well, after which practically all drilling in this field stopped. Within the past two years, the trend of the Dover fault has been discovered with a result as stated above. In the Eden field in Bayham township excellent results have been obtained; nine wells were drilled and no dry holes. This field has all indications of being of considerable importance; the average open flow is very high for this area as is the rock pressure. In Middleton township, Norfolk county, two (sulphur gas) wells at comparatively shallow depth show a very high average open flow but most unfortunately they are not useful for domestic purposes, on account of the high Hydrogen Sulphide content of the gas; of necessity the total output being diverted to industrial use. In Haldimand county and in the counties adjacent thereto, there were fewer wells drilled than in 1934, but the open flow shows favourable comparison with last year.

"The Haldimand field shows the greatest increase in dry holes. This is to be expected for since 1929, 1,052 producing wells and 362 dry holes, a total of 1,414 wells have been drilled within the limits of this old gas field, which includes the adjacent portions of Brant, Wentworth, Lincoln and Welland. If each well were drilled on 25 acres (which estimate is low) it would represent 35,350 acres drilled, of which 26,300 acres are productive. Should drilling continue at the present rate, it must extend beyond the limits of the present field."

On September 23rd natural gas was introduced into the City of London distribution plant. This gas was piped to London through a 10" transmission line from the Dawn field, a total distance of about 55 miles. Changes were completed during the year in the Tilbury gas field whereby the raw gas, containing 350 grams of sulphur per cubic foot will be brought to the Glenwood purification plant and the sulphur content reduced to approximately 15 grams per cubic foot, following which it will pass into the transmission line for distribution. In 1935 a 4" high pressure pipe line was laid to the suburbs of the City of St. Thomas where a distribution plant was installed and these residents supplied with natural gas.*

Drilling activities in Ontario during 1935 resulted in the bringing in of 201 producing wells with a total footage of 194,930 feet and the drilling of 88 dry wells aggregating 84,601 feet. During the preceding year, 217 producing wells were drilled to a total depth of 187,430 feet and 77 dry holes, to an aggregate depth of 86,681 feet.

At the end of 1935, there were 2,998 wells producing gas in Ontario. Forty-eight wells were abandoned during the year. On December 31, 1934, producing wells totalled 2,869 and during that year 60 wells were abandoned.

The 165 firms operating in the natural gas industry in Ontario in 1935 reported a total capital employment of \$42,898,557. Employment was furnished during the year to 519 salaried employees and 710 wage-earners; salaries and wages in 1935 totalled \$1,213,428.

The Lloydminster well in Saskatchewan commenced commercial production in October, 1934, and continued to supply the town of Lloydminster throughout 1935. During the year, 75,558 thousand cubic feet were produced.

Alberta's output in 1935 advanced 8.2 per cent to 16,060,349 thousand cubic feet from the 1934 total of 14,841,491 thousand cubic feet. These figures include only the natural gas consumed for industrial and domestic purposes and do not take account of the waste gas burned in the Turner Valley field and the gas piped from this field to the Bow Island field for storage.

The Turner Valley field, located about 35 miles southwest of Calgary, is the largest natural gas producing area in Canada. Industrial and domestic consumption of gas from this field in 1935 amounted to 9,718,000 thousand cubic feet as compared with 9,571,600 thousand cubic feet in 1934 and 9,846,431 thousand cubic feet in 1933. Approximately 23,300 consumers in Calgary, Lethbridge and the district were served with Turner Valley gas in 1935; in addition,

*Information from a report by Col. R. B. Harkness, Commissioner of Gas for Ontario.

a considerable quantity was used for drilling purposes in the field. Continuing the practice of preceding years, large quantities of this gas were piped to the Bow Island field for repressuring wells in that area.

The city of Medicine Hat consumed 2,225,251 thousand cubic feet of natural gas in 1935 as against 1,914,606 thousand cubic feet, a year ago. The Medicine Hat field supplied gas to 2,500 consumers in 1935. The Redcliff field, about two miles west of Medicine Hat, served approximately 260 industrial and domestic consumers.

Edmonton's supply of natural gas was obtained from the Viking field, located about 80 miles south-east of the city. In 1935, this field provided gas for 10,257 consumers in Edmonton and 493 consumers outside the city. About 300 consumers in Wainwright were supplied with gas from the Maple Leaf well in the Fabyan field.

On December 31, 1935, there were 96 wells in Alberta producing natural gas as against 92 wells at the close of 1934. Companies operating in this industry in Alberta during the year, reported capital employed at \$24,421,299. During the year under review 397 employees, receiving salaries and wages totalling \$598,402, were employed by Alberta operators.

Imports of mixed gas (natural and artificial) into Canada, from the United States, in 1935 totalled 106,401 thousand cubic feet worth \$70,154; a year ago, 107,171 thousand cubic feet at \$69,734 were imported.

Capital employed by the 199 operators in the Canadian natural gas industry amounted to \$69,221,051. On the average, 1,719 salaried employees and wage-earners were employed in this industry in 1935; these employees received salaries and wages totalling \$1,932,937. Fuel and electricity costs during the year amounted to \$66,093.

Table 211.—Production of Natural Gas in Canada, by Provinces, 1926-1935

(For the years 1892 to 1925 see Mineral Production of Canada, 1928)

Year	New Brunswick		Ontario		Manitoba		Alberta		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$		\$
1926.....	648,316	128,300	7,764,996	4,409,593	200	60	10,794,697	3,019,221	19,208,209	7,557,174
1927.....	630,755	124,637	7,311,215	4,231,780	200	60	13,434,621	3,586,533	21,376,791	8,043,010
1928.....	660,981	324,344	7,632,800	4,535,312	200	60	14,288,605	3,754,466	22,582,586	8,614,182
1929.....	678,456	333,002	8,586,475	4,959,695	600	180	19,112,931	4,684,247	28,378,462	9,977,124
1930.....	661,975	325,751	7,965,761	5,034,823	600	180	20,748,583	4,929,226	29,376,919	10,289,985
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,067,893	25,874,723	9,026,754
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794	23,420,174	8,899,462
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263	23,138,103	8,712,234
1934.....	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276	(a) 23,152,324	(a) 8,759,652
1935.....	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436	(b) 24,910,786	(b) 9,363,141

(a) Includes production in Saskatchewan, 13,781 M cu. ft. at \$4,823.

(b) Includes production in Saskatchewan, 75,558 M cu. ft. at \$7,555.

Table 212.—Production of Natural Gas in Canada, by Months, 1935

Month	New Brunswick	Ontario	(a) Manitoba	Saskatchewan	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	82,651	930,418	50	11,022	2,606,442	3,630,583
February.....	83,782	937,602	50	7,317	1,640,666	2,669,417
March.....	75,610	838,586	50	8,220	1,813,171	2,735,637
April.....	62,693	727,028	50	6,943	1,546,623	2,343,337
May.....	56,295	631,499	50	3,620	1,033,363	1,724,827
June.....	35,728	425,905	50	1,977	752,441	1,216,101
July.....	24,272	387,137	50	1,443	621,867	1,034,769
August.....	21,490	363,549	50	1,826	667,128	1,054,043
September.....	26,444	422,175	50	3,405	763,673	1,215,747
October.....	38,526	674,464	50	7,222	1,172,796	1,893,058
November.....	50,930	750,786	50	10,238	1,500,481	2,312,485
December.....	57,033	1,069,676	50	12,325	1,941,698	3,080,782
Total.....	615,454	8,158,825	600	75,558	16,060,349	24,910,786

(a) Estimated.

Table 213.—Natural Gas Production in Ontario, by Fields, 1934 and 1935 (a)

County	Fields	1934	1935
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	4,093,186	4,161,186
Kent.....	Tilbury.....		
	Dover.....	363,344	935,446
Lambton.....	Dawn and Oil Springs.....	517,009	411,944
Elgin.....	Bayham.....	51,483	116,118
Norfolk.....	Norfolk.....	354,274	472,993
Lincoln.....	Lincoln.....	1,801,160	1,576,323
Haldimand.....	Haldimand.....		
Wentworth.....	Wentworth.....		
Brant.....	Onondaga.....	109,486	120,461
Bruce.....	Amabel.....	500	400
Welland.....	Welland.....	318,409	290,119
Wells in surface drift.....	Howard and Sarnia.....	14,000	14,000
Private wells.....		60,000	60,000
Total produced.....		7,682,851	8,158,825
Value.....		\$ 4,741,368	\$ 4,938,084
Imported mixed gas.....	M cu. ft.	102,667	98,848
Total distributed.....	M cu. ft.	7,785,518	8,257,673

(a) Prepared by the Ontario Department of Mines.

Table 214.—Number of Gas Wells in Canada, by Provinces, 1933-1935

	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	Canada
Productive wells at beginning of year.....	1933 30	2,620	6		89	2,745
	1934 31	2,708	6		87	2,832
	1935 30	2,869	6	1	92	2,998
Number of productive wells drilled.....	1933 1	173				174
	1934 1	217		1	1	220
	1935 1	201		2		204
Number of dry wells drilled.....	1933 2	67				69
	1934	77	1	2		(a) 81
	1935	88	1	2		90
Number of wells abandoned.....	1933	55				55
	1934 2	60				62
	1935	48			2	50
Productive wells at end of year.....	1933 31	2,708	6		87	2,832
	1934 30	2,869	6	1	92	2,998
	1935 35	2,998	6	1	94	3,134

(a) Includes one dry well drilled in Quebec.

Table 215.—Natural Gas Wells in Ontario, by Townships, 1934 and 1935

Township	1934				1935			
	No. of producing wells in operation Dec. 31, 1934	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1935	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Aldborough.....			1					
Amabel.....	2		1		2		5	3
Ancaster.....				1				
Bayham.....	38		2	4	45	1		9
Bertie.....	99	1		4	95	1	1	1
Beverley.....	53	1			52		1	
Binbrook.....	53	1			52			
Caistor.....	60	2		3	64	1		4
Canboro.....	181	3	1	16	185			13
Caledon, East.....		1			5			
Cayuga, North.....	173		4	18	191	2	7	21
Cayuga, South.....	54		1	1	55		1	1
Charlotteville.....	13				13			
Chatham.....			1				1	
Chinguacousy.....			1					
Crowland.....	25	7			26	3		
Dawn.....	15		4	1	22			
Dereham.....								2
Dorchester, North.....								
Dover, East.....	12		2	3	22		2	10
Dover, West.....								
Dunn.....	52	5	1	7	49	2		1
Enniskillen.....	4				4			
Euphemia.....		3	1					
Gainsboro.....	13		5	10	13	2		1
Glanford.....	11				11			2
Gosfield.....	17		1	1	23			3
Houghton.....	5	2			4			
Humberstone.....	60	2			57	3		
Keppel.....								1
Malahide.....	1				1			
Mersea.....	3				3			
Middleton.....	44		2	7	47		1	2
Moulton.....	112	3	1	13	112	9	8	7
Oneida.....	59	1	4	8	69	2	12	15
Onondaga.....	39	9	2	8	44	1	4	5
Rainham.....	276	1	2	8	282	5	12	16
Raleigh.....	32	1	3	5	37	1	3	2
Romney.....	140	1			139	1		
Sarnia.....	13				13			
Seneca.....	174	12	2	19	183	3	8	13
Sherbrooke.....	13				12	1		
Sombra.....			3					
Tilbury, East.....	144			3	145		1	1
Townsend.....	2		1		2			
Tuscarora.....	74	1		11	76	4		6
Wainfleet.....	27				25	1	1	2
Walpole.....	323	1	29	55	361	2	14	51
Walsingham, N.....	14				13	1		
Walsingham, S.....	12			1	13	1	1	2
Windham.....	10		1	2	10			
Willoughby.....	42	3	2	2	41		2	1
Woodhouse.....	59		1	4	62		2	5
Private wells.....	300				300			
Surface wells.....	69				69			
Total.....	2,869	60	77	217	2,995	48	88	201

Table 216.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1934 and 1935

	1934				1935		
	Quebec	Ontario	Alberta	Canada	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—							
Cost of lands, buildings, plant, machinery and tools.....							
Cost of supplies and stock on hand.....							
Cash, trading and operating accounts and bills receivable.....							
Total.....							
	38,000	35,557,607	24,433,232	61,696,193	35,197,406	22,706,343	59,679,653
		425,307	166,200	655,094	387,334	166,027	567,134
		6,821,544	1,502,198	8,415,836	7,313,817	1,548,929	8,974,264
	38,000	42,804,458	26,101,630	*70,767,123	42,898,557	24,421,299	†69,221,051

*Includes data for New Brunswick, Manitoba and Saskatchewan.

†Includes data for New Brunswick and Saskatchewan.

Table 217.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1934 and 1935

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1934					\$	\$	\$
New Brunswick.....	14	6	51	71	36,102	65,383	101,485
Quebec.....	1		11	12	3,800	19,605	23,405
Ontario.....	382	104	588	1,074	632,237	515,337	1,147,574
Manitoba.....			1	1		1,802	1,802
Saskatchewan.....	1		17	18	400	18,166	18,566
Alberta.....	87	25	265	377	169,520	327,459	496,979
Canada.....	485	135	933	1,553	842,059	947,752	1,789,811
1935							
New Brunswick.....	14	6	56	76	36,390	63,486	99,876
Ontario.....	422	97	710	1,229	652,524	560,904	1,213,428
Saskatchewan.....	1		16	17	300	20,931	21,231
Alberta.....	87	31	279	397	173,553	424,849	598,402
Canada.....	524	134	1,061	1,719	862,767	1,070,170	1,932,937

* See footnote on page 26.

THE PEAT INDUSTRY

The Canadian production of peat in 1935 amounted to 1,340 tons valued at \$5,761; in the preceding year, 1,878 tons worth \$7,343 were produced. Production during the past two years has been obtained entirely from bogs in Ontario.

Table 218.—Production of Peat in Canada, 1925-1935

Year	Tons	Value
		\$
1925.....	1,370	8,394
1926-27.....	.....	.....
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343
1935.....	1,340	5,761

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products.

1. Production of Crude Petroleum

Canada produced 1,446,620 barrels of crude petroleum in 1935 as compared with 1,410,895 barrels in the preceding year. Production in 1935 consisted of 12,954 barrels from New Brunswick, 165,041 barrels from Ontario, 1,263,510 barrels from Alberta and 5,115 barrels from the Northwest Territories.

The Alberta production of 1,263,510 barrels was 0.8 per cent higher than the 1934 total. During the year under review, the Turner Valley field produced 1,234,872 barrels of crude naphtha and light crude oil, the Red Coulee field, 14,772 barrels and the Wainwright and Skiff fields, 13,866 barrels. One hundred and twenty-two wells were in operation at the close of 1935 and drilling was in progress on 12 other wells in the Turner Valley, Pekisko, Hunter Valley, Moose Dome, Comrey and Cardston fields. Five new wells were brought into production during the year as compared with eight in 1934. Approximately 59,900 feet of drilling were done in 1935; in the preceding year, 72,000 feet were drilled. Casing used by Alberta operators in 1935 totalled 69,510 feet weighing 1,383 tons; a year ago, 128,830 feet of casing weighing 2,838 tons were used. The value of the casing used in 1935 was reported at \$118,444 as against the previous year's valuation of \$252,710.

Three natural gasoline absorption plants were in operation in the Turner Valley field during 1935. Two of these plants are owned by the Royalite Oil Company Limited; the second plant commenced operations during July, 1935. The South Turner Valley plant of the Gas and Oil Products Limited, was operated throughout 1935.

The Petroleum and Natural Gas Division of the Alberta Department of Lands and Mines reviews operations in the Turner Valley field in 1935, as follows:

"Turner Valley continued as the principal producer, yielding nearly 96% of the total oil recovered in the province. The oil recovered from Turner Valley is largely a product which existed in its subsurface limestone container in vapour phase, suspended in gas. Its recovery in earlier years had been largely by means of gravity separators, the liquids being condensed by refrigeration set up by expansion of gas. In 1933 the first absorption plant was put into operation to extract liquids remaining in the gas after passing the separators. A second absorption plant followed in 1934, and in 1935 a third large plant was constructed, as well as a small plant to handle the gas from a single well. Plant recoveries during 1935 reached nearly 500,000 barrels, but separator recoveries dropped as reservoir pressures decreased.

"In addition to vapour phase oil recovered, it became apparent that some wells were yielding a product which must have been in liquid phase in the limestone container. That is, the oil contained fractions which remain liquid at the highest temperatures likely to be encountered in the limestone. It is not a simple matter to segregate such production, for the same well under different operating conditions may produce either vapour or liquid phase oil—differing between 73°, highly volatile natural gasoline to perhaps as low as 40° or 45° crude, according to the method of operation. Granting that there is room for differences in opinion as to classification of wells as between liquid phase and vapour phase producers, we have segregated certain ones and their total production, as liquid phase wells, with the following results:

	Liquid phase oil	Vapour phase recovered in		Total limestone production	Gas Drawn M.M.Mcf.
		separators	plants		
1934.....	78,624	717,818	414,324	1,210,766	91.80
1935.....	124,893	586,747	496,681	1,208,321	88.59

"It will be seen that while there is very little change in total limestone production, increases in plant recoveries and in liquid phase oil were needed to make up for drastic decrease in separator recovery from vapour phase oil, and withdrawals of gas were almost as great in 1935 as the year before."

A steady increase has been recorded in the production of crude petroleum in Ontario during the past five years. The 1935 output amounted to 165,041 barrels averaging \$2.10 per barrel as compared with 141,385 barrels with an average of \$2.12 in 1934 and 136,058 barrels at \$1.86 per barrel in 1933.

Col. R. B. Harkness, Commissioner of Gas for Ontario, summarizes activities in the petroleum industry in Ontario during 1935, as follows:

"The total increase in 1935 over the lowest year (1930) is 32% and this with only one actually new discovery. To equal this year's production it is necessary to go back fourteen years, at which time there were 1,400 more producing wells than at present, when the price for oil at the refinery was \$2.67 in addition to which the Dominion Government paid a bounty of 52½ cents per barrel, a total of \$1.09½ above today's prices. The great increase is in the Bothwell field where without increasing the production area but simply by opening old wells shut down and abandoned possibly thirty years ago, the production has been brought back in line with that of 1911-1912. Two new fields have been brought into production since these years—the Dover field and the Dawn field, but the important increase came in the old fields that had been in operation for from fifty to seventy years.

"The work mentioned in last year's report of cleaning out and recasing (some cases redrilling) old wells in the Bothwell field has been continued in 1935 with remarkable success. Practically the whole area, opened up following the discovery of oil on the Thames by Lick in 1865, that has lain idle for many years, has been treated in this manner.

"The activity in Brooke township has ceased, following the disappointing results from these wells which had a high initial production. From a total of 36 wells representing an estimated

investment of \$50,000 in wells and equipment, a total of 2,063 barrels of oil was produced, the value of which is \$4,371.

"The activity in the Dover field extended across the Thames River into Raleigh township where a well was drilled that had an initial production of 20 barrels per day. The well has a very small quantity of gas not sufficient to flow the oil to the surface. This well although in Raleigh township has been included in the Dover field since the old Raleigh oil fields were six miles south of this well, which is actually an extension of the adjoining Dover township field. This well and two others produced over 13,000 barrels.

"All of the Dawn oil wells are not operated continuously; some of them produce gas as well as oil, and the oil production for the year depends on the continuity of operation. The increase and decrease in annual production does not in any way indicate additional producing wells or failure of the present wells."

Drilling operations in the Ontario petroleum fields were carried on by fourteen rigs with a capital investment of \$52,200. Twenty-three men were employed during the year and disbursements for salaries and wages totalled \$11,950. In all, 29,612 feet were drilled during the year.

New Brunswick's production in 1935 advanced to 12,954 barrels from the preceding year's total of 11,106 barrels. This production was obtained, as usual, from the Stony Creek field near Moncton. The crude oil was treated in a small topping plant at Weldon and gasoline and fuel oil were recovered.

Discovery No. 1 and No. 2 wells near Fort Norman, Northwest Territories, were operated in 1935 and produced 5,115 barrels; in 1934 these wells produced 4,438 barrels. This oil, which ranged from 38° to 41° Bé, was treated at a small refinery near Fort Norman and a considerable part of the gasoline and fuel oil was used in connection with mining operations in the Great Bear Lake area.

Companies operating and drilling oil wells in Canada during 1935 reported capital employed during the year at \$33,398,894. This industry furnished employment to 940 salaried employees and wage-earners who received a total remuneration of \$1,046,046. Fuel and electricity used during the year cost the operators \$160,678. The cost of process supplies (explosives, drill steel, lubricants, etc.) used in 1935 was \$647,822.

Exports of petroleum and its products from Canada in 1935 were valued at \$924,524 or 23.2 per cent below the 1934 total. Gasoline and naphtha accounted for 44.7 per cent of the 1935 exports.

Canada imported petroleum, asphalt and their products in 1935 to a value of \$44,092,526 as compared with the 1934 valuation of \$41,326,516 and the 1933 total of \$31,046,337.

Imports into Canada of crude petroleum in its natural state during 1935 totalled 1,156,788,480 gallons: the United States supplied 74.8 per cent of this quantity; Columbia, 9.8 per cent; Peru, 8.2 per cent; Venezuela, 6.8 per cent; Dutch West Indies, 0.3 per cent and other countries 0.1 per cent. Crude petroleum, not in its natural state, imported during the year amounted to 1,098,559 gallons; all of which came from the United States. Gasoline importations advanced 10.5 per cent to 68,032,212 gallons from the 1934 total and consisted of 70.5 per cent from the United States; 26.1 per cent from Peru; 3.3 per cent from Roumania and the remainder from other countries. Receipts of fuel oil for Canadian consumption were recorded at 30,887,850 gallons as against 32,959,499 gallons in 1934. In addition to this quantity, 18,389,860 gallons of imported fuel oil were ex-warehoused for ships' stores.

Table 219.—Production of Crude Petroleum in Canada, by Provinces, 1926-1935

(For the years 1881 to 1925 see Mineral Production of Canada, 1928.)

(Barrel=35 Imp. gal.)

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1926.....	10,544	29,940	137,850	379,221	216,050	902,504	.....	.....	364,444	1,311,665
1927.....	18,244	41,748	139,606	288,347	318,741	1,185,948	.....	.....	476,591	1,516,043
1928.....	8,043	21,391	134,094	249,737	482,047	1,764,172	.....	.....	624,184	2,035,300
1929.....	7,499	19,909	121,194	253,678	988,675	3,458,177	.....	.....	1,117,368	3,731,764
1930.....	6,758	17,378	117,302	235,746	1,398,160	4,780,696	.....	.....	1,522,220	5,033,820
1931.....	6,577	15,461	122,365	219,993	1,413,631	3,976,220	.....	.....	1,542,575	4,211,674
1932.....	6,408	14,332	130,343	247,468	906,751	2,751,541	.....	.....	1,042,412	3,022,592
1933.....	8,335	18,111	136,058	253,486	995,832	2,944,157	4,608	23,037	1,145,333	3,138,791
1934.....	11,106	22,277	141,335	299,874	1,253,966	3,104,823	4,438	22,188	1,410,895	3,449,162
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,446,620	3,492,188

Table 220.—Production of Crude Petroleum in Canada, by Months, 1935

(Barrel=35 Imp. gal.)

	(a) New Brunswick	Ontario	(a) Alberta	(a) Northwest Territories	Canada
	Barrels	Barrels	Barrels	Barrels	Barrels
January.....	70	13,446	110,424		123,940
February.....	62	11,588	93,753		110,403
March.....	53	11,198	108,082		119,333
April.....	1,569	12,998	99,850		114,417
May.....	1,861	17,686	105,488		125,035
June.....	1,405	13,812	105,183		120,400
July.....	1,808	15,811	102,115	2,496	122,230
August.....	1,893	14,468	102,741	2,415	121,517
September.....	1,566	13,688	109,143	143	124,540
October.....	1,858	13,787	107,901		123,546
November.....	1,161	11,935	103,952		117,048
December.....	53	14,624	110,118		124,795
Total.....	13,359	165,041	1,263,750	5,054	1,447,204

(a) These figures represent the total output each month.

Table 221.—Production of Crude Petroleum in Canada, by Provinces, 1934 and 1935

Provinces	1934		1935	
	Barrels	Total value	Barrels	Total value
		\$		\$
NEW BRUNSWICK.....	11,106	22,277	12,954	18,230
ONTARIO—				
Petrolia and Enniskillen.....	57,938	121,642	59,282	123,243
Oil Springs.....	29,863	65,684	31,646	68,926
Moore Township.....	2,963	6,221	3,264	6,783
Sarnia Township.....	825	1,732	871	1,810
Plympton Township.....	202	424	237	493
Bothwell.....	32,133	67,463	34,714	72,136
West Dover.....	558	1,171	13,117	27,257
Onondaga.....	601	1,311	431	874
Mosa Township.....	9,031	18,961	8,788	18,262
Thamesville.....	614	1,289	428	889
Dawn and Euphemia.....	4,169	8,753	11,538	23,976
Raleigh.....	264	554	195	405
Brooke.....	1,941	4,075	122	254
Dunwich.....	283	594	408	848
Total for Ontario.....	141,385	299,874	165,041	346,156
ALBERTA—				
Turner Valley.....	1,220,862	3,065,955	1,234,872	3,071,951
Red Coulee-Border-Keho.....	20,854	28,051	14,772	18,847
Wainwright-Skiff.....	12,250	10,817	13,866	11,429
Total for Alberta.....	1,253,966	3,104,823	1,263,510	3,102,227
NORTHWEST TERRITORIES.....	4,438	22,188	5,115	25,575
Canada.....	1,410,895	3,449,162	1,446,620	3,492,188

Table 222.—Petroleum Wells in Canada, by Provinces, 1933-1935

	New Brunswick	Ontario	Alberta	Canada
Productive wells at beginning of year.....	1933 23	2,036	111	2,170
	1934 23	2,151	113	2,287
	1935 23	2,066	122	(a) 2,213
Number of productive wells drilled.....	1933 5	5	5	10
	1934 11	8	8	19
	1935 12	5	5	17
Number of wells abandoned.....	1933 237	2	2	239
	1934 102	9	1	111
	1935 32	1	1	33
Number of dry wells drilled.....	1933 3	1	1	4
	1934 12	3	3	15
	1935 47	2	2	49
Number of productive wells in operation at end of year.....	1933 23	2,151	113	2,287
	1934 23	2,066	122	(a) 2,213
	1935 23	2,109	122	(a) 2,256

(a) Includes 2 wells in the Northwest Territories.

Table 223.—Imports into Canada and Exports of Petroleum, Asphalt and Their Products, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
IMPORTS—		\$		\$		\$
ASPHALT AND ITS PRODUCTS						
Asphaltum, or asphalt, solid..... tons	4,462	106,586	5,015	114,951	120,024	126,979
Asphalt, not solid..... gals.		10,312	98,657	11,030	113,104	12,265
Asphaltum oil for paving purposes only, gals.		1,458	14,619	1,832	29,035	2,338
CRUDE PETROLEUM, FUEL AND GAS OILS						
Crude petroleum in its natural state, .7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories..... gals.	954,392,366	20,290,580	1,072,827,425	31,907,176	1,156,788,480	33,816,433
Crude petroleum, gas oils other than naphtha, benzine and gasoline lighter than .8235 but not less than .775 specific gravity at 60 degrees..... gals.	60,331	3,773	181,278	9,740	29,797	1,728
Petroleum, crude, not in its natural state, .725 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories..... gals.	25,636,911	1,031,971	1,782,276	98,920	1,098,559	66,558
Petroleum (not including crude petroleum imported to be refined or illuminating or lubricating oils) .8235 specific gravity or heavier at 60 degrees temperature (fuel oil)..... gals.	43,271,325	1,445,467	32,959,499	1,149,541	30,887,850	1,108,762
Petroleum, and other oils, imported by miners or mining companies or concerns for use in the concentration of ores of metals in their own concentrating establishments..... gals.	95,421	47,948	77,126	85,364	68,155	49,354
Fuel oil, ex-warehoused for ships' stores..... gals.	26,896,996	723,863	23,481,946	589,843	18,389,862	507,283
KEROSENE AND ILLUMINATING OILS						
Coal oil and kerosene, lighter than .8235 specific gravity at 60 degrees temperature, n.o.p..... gals.	1,569,384	116,657	1,985,739	142,025	1,269,150	111,667
Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon..... gals.	3,658	1,585	1,062	345	3,337	1,120
Engine distillate, lighter than .8235 specific gravity at 60 degrees temperature..... gals.	64,626	6,880	132,795	12,946	83,962	8,731
LUBRICATING OILS						
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon..... gals.	6,208,152	1,160,093	6,872,364	1,047,882	10,232,069	1,457,333
Lubricating oils, n.o.p..... gals.	3,660,582	1,464,241	3,648,960	1,345,094	3,019,201	1,188,992
GASOLINE AND OTHER OILS						
Natural casinghead compression or absorption gasoline, lighter than .6690 specific gravity at 60 degrees temperature, when imported by distillers of petroleum for blending with other gasoline distilled in Canada..... gals.	39,688,271	2,545,302	48,376,014	2,593,460	48,417,345	2,889,814
Gasoline lighter than .8235 specific gravity at 60 degrees temperature..... gals.	17,122,366	1,446,766	13,205,856	1,248,497	19,614,867	1,661,306
All other oils, n.o.p..... gals.	305,985	90,768	580,667	117,509	3,103,221	233,680
OTHER PRODUCTS OF PETROLEUM						
Grease, axle..... lb.	2,417,038	130,792	3,374,842	169,183	3,973,299	203,310
Paraffine wax..... lb.	1,760,621	60,955	6,063,526	268,741	5,234,224	196,118
Paraffine wax candles..... lb.	165,491	32,174	146,075	28,647	164,500	30,737
Vaseline and all similar preparations of petroleum for toilet, medicinal or other purposes.....		214,539		241,063		252,740
Naphtha and products of petroleum, n.o.p., lighter than .8235 specific gravity at 60 degrees temperature..... gals.	1,244,930	113,627	1,868,361	142,927	1,922,743	165,278
Total.....		31,046,337		41,326,516		44,092,526
EXPORTS—						
Oil, petroleum, crude..... gals.	10,658,848	394,727	5,438	497	897	132
Oil, coal and kerosene, refined..... gals.	996,468	179,986	782,350	78,618	860,760	99,783
Oil, gasoline and naphtha..... gals.	4,042,959	627,851	4,757,175	528,197	3,357,902	413,469
Fuel oil and other mineral oils, n.o.p. (to March 31, 1935)..... gals.	12,938,982	537,776	12,994,817	585,785	686,393	34,364
Fuel oil (from April 1, 1935)..... gals.					8,349,733	240,577
Oil, mineral, n.o.p. (from April 1, 1935)..... gals.					465,697	110,177
Wax, mineral..... cwt.	2,498	6,955	2,633	10,219	5,829	26,022
Total.....		1,747,295		1,203,316		924,524

Table 224.—World Production of Crude Petroleum

(Supplied by Imperial Institute)

(Long tons)

	1933	1934	1935
BRITISH EMPIRE			
United Kingdom (estimated) (c).....	118,000	119,000	118,000
Canada.....	145,432	174,047	183,116
Barbados.....	574	480	410
Trinidad (b).....	1,309,775	1,492,378	1,598,798
Bahrein Islands.....	4,400	40,700	180,700
British Borneo (Sarawak).....	321,299	278,037	253,714
Brunei (exports).....	280,523	371,591	441,744
India (b).....	1,181,502	1,243,341	1,245,801
New Zealand.....	693	636	760
Australia (Victoria).....	80	23	18
Total.....	3,362,000	3,725,000	4,024,000
FOREIGN COUNTRIES			
Austria.....	842	4,113	6,512
Czechoslovakia.....	17,495	25,461	29,000
Estonia (c).....	37,617	46,137	36,782
France.....	77,979	77,122	73,679
Germany.....	234,819	312,524	420,611
Greece.....		261	(a)
Italy (c).....	26,107	19,861	15,725
Yugoslavia.....	498	472	256
Poland.....	541,976	520,849	506,630
Roumania.....	7,260,101	8,332,493	8,253,000
Russia.....	21,287,000	23,766,000	24,842,000
Spain (c).....	5,164	2,818	(a)
Algeria.....	551	367	338
Egypt.....	233,970	217,537	179,129
Morocco (French).....	552	542	106
Mexico (b).....	5,151,641	5,783,628	6,096,170
United States (b).....	122,385,900	122,711,500	134,316,500
Argentina (d).....	1,924,731	1,971,736	2,009,665
Bolivia.....	16,007	22,645	23,328
Colombia (b).....	1,852,975	2,441,958	2,473,521
Ecuador.....	231,415	234,145	241,000
Peru.....	1,733,909	2,128,063	2,221,000
Venezuela.....	17,020,071	20,385,588	21,640,000
China (c).....	455	373	(a)
Formosa (b).....	5,204	5,008	6,000
Iraq.....	113,000	1,015,195	3,624,137
Japan (b).....	196,900	247,817	256,206
"Manchoukuo".....	90,502	96,410	(a)
Netherlands East Indies.....	5,439,930	5,946,772	5,985,651
Iran (Persia).....	7,086,706	7,537,372	7,487,697
Total.....	193,000,000	204,000,000	221,000,000
World's Total.....	196,362,000	208,000,000	225,024,000

(a) Information not available.

(b) The following conversion rates have been used; 35 gallons=1 barrel and the undermentioned barrels=1 ton:—Mexico 6-6, Trinidad 7-3, India 7-4, United States 7-4, Colombia 7-1, Formosa 7-0, Japan 7-2.

(c) Including shale oil.

(d) Converted from cubic metres at rate of 1 cubic metre=·8843 long tons.

Table 225.—Capital Employed in the Petroleum Industry in Canada, by Provinces,* 1934 and 1935

	1934			1935		
	Ontario	Alberta	Canada†	Ontario	Alberta	Canada†
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	1,355,498	27,330,881	28,719,653	1,022,116	24,654,058	25,698,966
Cost of supplied and stocks on hand.....	10,363	1,178,663	1,235,331	7,180	1,002,480	1,027,976
Cash, trading and operating accounts and bills receivable.....	12,016	5,433,440	5,453,817	11,140	6,657,484	6,671,952
Total.....	1,377,877	33,942,984	35,408,801	1,040,436	32,314,022	33,398,894

* Data for New Brunswick included in the "Natural Gas Industry".

† Includes data for the Northwest Territories.

Table 226.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,† 1934 and 1935

Province	* Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1934					\$	\$	\$
Ontario	12		192	204	12,007	98,001	110,008
Alberta†.....	117	31	592	740	221,650	740,959	962,609
Canada	129	31	784	944	233,657	838,960	1,072,617
1935							
Ontario	12	1	208	221	13,755	114,107	127,862
Alberta†.....	113	26	580	719	249,982	668,202	918,184
Canada	125	27	788	940	263,737	782,309	1,046,046

* See footnote on page 26.

† Data for New Brunswick included in the "Natural Gas Industry".

‡ Data for the Northwest Territories included with Alberta.

Table 227.—Casing Used in the Petroleum Industry in Alberta, 1934 and 1935

Size	1934		1935		Size	1934		1935	
	Weight	Length	Weight	Length		Weight	Length	Weight	Length
Inches	Pounds	Feet	Pounds	Feet	Inches	Pounds	Feet	Pounds	Feet
6....	66,000	3,000	55,744	2,534	13½..	1,205,770	21,890	320,388	5,508
6½....	21,504	768			13¾..	15,914	292		
6¾....	147,924	5,283	654,435	22,828	15½..	98,091	1,816	30,375	405
7....	141,260	5,045			16....	593,640	9,117	294,731	3,930
8....	493,632	13,712	123,879	3,441	18....	48,972	634	61,600	800
8½....	569,389	15,817			18½..	231,137	3,020	70,077	750
8¾....	131,652	3,657			18¾..	8,229	105		
8½....	618,480	17,839	680,940	19,647	20....	46,620	518		
10....	514,543	11,663	315,990	7,022	21....	3,605	35	15,450	150
10½..	409,481	9,055	6,420	143	21½..	43,449	476	13,154	142
12....	7,500	150			25....	2,513	25	2,512	25
12½..	237,786	4,583	52,609	974					
13....	18,480	330	67,797	1,211	Total...	5,675,571	123,830	2,766,101	69,510

(2) The Petroleum Products Industry in Canada

Forty-five petroleum refineries were in operation in Canada during 1935. These plants were located as follows: 14 in Saskatchewan, 9 in Alberta, 7 in Ontario, 4 in each of Quebec, Manitoba and British Columbia, and 1 in Nova Scotia, 1 in New Brunswick and 1 in the Northwest Territories. The combined capacity of these refineries was 160,350 barrels of crude oil per day. Fifteen plants operated cracking units with a capacity of 75,350 barrels per day.

The firms operating in the petroleum refining industry in Canada reported capital employed during the year at \$64,012,045. The average number of employees engaged in 1935 was 4,771; salaries and wages paid during the year totalled \$7,046,675. Materials used in the refineries cost \$58,415,916, while the value of products made was \$79,176,081.

A total of 1,196,411,443 gallons of crude oil were used during the year; this represented a scale of operations equal to 58 per cent of capacity. The United States supplied 857,577,534 gallons of the crude oil used, Trinidad and South American countries, 298,048,436 gallons and Canadian wells, 40,785,473 gallons. The United States crude included 2,418,107 gallons not in its natural state and the crude from other countries 3,770,254 gallons. The Canadian crude included 32,278,083 gallons of naphtha and absorption gasoline. Crude oil on hand at the refineries on December 31, 1935, totalled 125,979,806 gallons of which 125,753,615 gallons were in its natural state and 226,191 gallons reduced crude.

Gasoline production in 1935 amounted to 513,716,004 gallons of which 292,520,425 gallons were made by the straight run process and 221,195,579 gallons by cracking. In addition, the refineries used for blending purposes a total of 52,823,336 gallons of imported casinghead gasoline which were not included in the above production figures. The output of gasoline in 1935 was the highest on record being 11 per cent greater than the 1934 production and double the quantity made in 1927. The value of the 1935 production, at refinery prices, was \$45,182,357. Refinery stocks at the end of the year included 81,463,970 gallons of straight run and cracked gasoline and 6,719,209 gallons of imported casinghead, the latter for blending purposes.

Fuel and gas oils produced in 1935 (excluding any made and used for cracking purposes) totalled 469,969,708 gallons of which 417,840,170 gallons were for sale and 52,129,538 gallons for use as fuel in refineries. Imports aggregated 49,277,712 gallons and exports, 8,359,049 gallons. Refinery stocks on December 31st were reported at 74,998,192 gallons or 5,044,245 gallons above the quantity on hand at the end of 1934.

In 1935 thirteen firms were engaged primarily in the compounding of lubricating oils and greases. The production by these firms was valued at \$774,444 as compared with the preceding year's total of \$551,836. Capital employed in this industry in 1935 was recorded at \$695,409; employment was furnished 85 persons who received \$106,549 in salaries and wages.

Table 228.—Materials Used and Products Made by the Oil Refineries of Canada, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
MATERIALS USED—		\$		\$		\$
<i>Petroleum refining—</i>						
Crude oil, in its natural state						
from Canadian wells.....imp. gal.	32,404,139	2,774,379	34,304,479	2,598,824	8,507,390	547,879
Naphtha, absorption gasoline, etc						
from Canadian wells.....imp. gal.			7,157,284	640,074	32,278,083	2,467,409
Crude oil in its natural state—						
(a) From the United States...imp. gal.	688,869,955	30,835,697	768,765,241	38,165,168	855,159,427	40,708,492
(b) From South America.....imp. gal.					292,502,072	10,880,552
(c) From other countries....imp. gal.	322,936,756	11,729,822	265,845,557	10,140,741	1,776,110	70,191
Crude oil, not in its natural state—						
(a) From the United States...imp. gal.	Included	with	1,617,289	171,205	2,418,107	226,434
(b) From other countries....imp. gal.	natural	crude.	31,820,493	1,926,089	3,770,254	202,376
Sulphuric acid (66° Bé).....lb.	24,057,138	239,016	24,696,413	250,501	23,098,907	224,014
Sulphur.....lb.	67,730	2,464	117,279	4,095	156,773	5,098
Caustic soda.....lb.	3,291,438	104,992	3,324,629	111,870	3,180,180	99,149
Soda ash.....lb.	284,761	6,483	289,418	6,636	237,466	5,280
Litharge.....lb.	364,934	23,536	356,648	26,898	388,112	26,286
Fullers' earth.....lb.	22,811,655	314,515	18,588,514	239,357	18,487,148	260,885
Compounding materials.....		372,020		338,247		356,519
Tetraethyl fluid.....		1,451,453		1,249,314		1,461,153
Other materials.....		113,419		264,055		321,699
Shipping containers.....		949,170		526,418		552,500
Total.....		48,916,966		56,659,492		58,415,916
<i>Lubricating oils and greases—Total.....</i>		<i>270,791</i>		<i>309,623</i>		<i>453,898</i>
Grand total.....		49,187,757		56,969,015		58,869,814
PRODUCTS MADE—						
<i>Petroleum refining—</i>						
Made for sale—						
Gasoline (a) straight run*...imp. gal.	267,010,338	25,933,516	294,665,314	28,478,159	292,313,856	26,595,550
(b) by cracking process.....imp. gal.	155,843,903	13,911,439	166,773,271	13,956,313	221,195,579	18,566,703
Fuel oil (except for cracking)...imp. gal.	282,580,908	9,617,675	300,071,842	10,560,733	417,840,170	15,647,726
Gas oils.....imp. gal.	91,390,183	4,712,675	101,549,871	5,412,798		
Tractor and engine distillate...imp. gal.					39,431,237	3,410,812
V.M. & P. or solvent naphtha...imp. gal.	33,947,241	2,987,440	36,223,392	3,183,330	9,124,052	687,833
Kerosene.....imp. gal.	48,951,129	4,455,425	37,675,985	3,635,618	31,767,027	3,055,093
Lubricating oils.....imp. gal.	17,194,703	2,983,331	18,928,038	3,896,754	17,814,927	3,484,794
Grease.....lb.	8,339,991	357,205	9,960,640	563,514	11,352,074	515,401
Tar.....lb.						
Asphalt.....imp. gal.	21,627,760	1,698,023	25,584,495	2,303,717	34,668,858	3,119,530
Petroleum coke.....tons	54,646	322,379	52,467	295,111	63,843	372,723
Wax and candles.....lb.	8,997,682	355,308	10,655,682	476,899	11,237,594	434,918
Other products.....		4,350		171,114		43,735
Total for sale.....		67,338,766		72,934,060		75,934,818

*Includes Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casing-head gasoline which was used for blending at the refineries.

Table 228.—Materials Used and Products Made by the Oil Refineries of Canada, 1933-1935—Concluded

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Made for own use—						
Gasoline (a) straight run.....imp. gal.	75,892	6,940	314,778	23,151	201,569	20,104
(b) by cracking process.....imp. gal.	6,660	743			1,466	154
Fuel oil (except for cracking).....imp. gal.	55,884,197	1,611,981	53,918,147	1,836,395	52,128,072	1,930,390
Gas oils.....imp. gal.	458,804	25,981	455,465	23,484		
V.M. & P. or solvent naphtha.....imp. gal.	71,914	5,611	70,255	4,245	3,560	368
Kerosene.....imp. gal.	77,200	6,188	66,008	5,365	66,690	5,338
Lubricating oils.....imp. gal.	54,957	8,731	48,404	12,589	48,680	11,498
Tar.....imp. gal.			1,306,410	49,927	1,213,240	48,529
Grease.....lb.	4,855	255	7,158	444	6,442	299
Asphalt.....imp. gal.	18,420	1,496	108,563	2,044	11,781	1,066
Petroleum coke.....tons	20,079	115,400	9,293	57,961	8,348	21,256
Still gas.....M cu. ft.	3,505,405	631,116	3,772,746	777,351	5,154,885	1,103,166
Wax and candles.....lb.	386	15	433	29		
Other products.....		50,498		58,632		97,095
Total for own use.....		2,464,955		2,851,617		3,241,263
Total Petroleum refining.....		69,803,721		75,785,677		79,176,081
Fuel and gas oils made and used in pressure cracking process.....imp. gal.	364,389,832		†309,595,786		†398,176,385	
Lubricating oils and greases—						
Lubricating oils.....imp. gal.	576,560	311,767	543,258	397,751	1,355,690	616,956
Lubricating greases.....lb.	896,755	112,656	832,201	104,042	727,324	112,431
Soaps and soap powders.....lb.	310,996	30,386	475,591	39,476	347,762	32,692
Other products.....		9,735		10,567		12,365
Total lubricating oils and greases.....		464,544		551,836		774,444
Grand total.....		70,268,265		76,337,513		79,950,525

† Not including 5,473,582 gallons of heavy naphtha and 1,389,045 gallons of crude.

‡ Not including 1,845,016 gallons of heavy naphtha.

CHAPTER EIGHT

THE NON-METAL MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Abrasives	Miscellaneous—	Manganese bog
Asbestos	Actinolite	Mineral waters (natural)
Feldspar and Quartz	Barytes	Natro-alunite
Gypsum	Bituminous sands	Phosphate
Iron oxides (ochre)	Fluorspar	Pyrites
Mica	Graphite	Silica brick
Salt	Magnesitic dolomite	Sodium carbonate
Talc and soapstone	Magnesium sulphate	Sodium sulphate

THE ABRASIVES INDUSTRY IN CANADA

The abrasives industry in Canada includes two main divisions: (1) The Natural Abrasives Industry, covering the production of natural abrasives such as grindstones, pulpstones and scythestones, corundum, diatomite, volcanic dust, etc., and (2) the Artificial Abrasives and Abrasive Products Industry, which covers the manufacture of silicon carbide, fused alumina, abrasive wheels, abrasive paper, etc.

(1) Natural Abrasives

The number of firms reporting shipments in the natural abrasives industry in 1935 totalled 9 as compared with 11 in the preceding year. Shipments during 1935 were reported from two properties in Nova Scotia, three in New Brunswick, one in Ontario and three in British Columbia.

The industry during 1935 provided employment to 42 persons and disbursed \$25,135 in salaries and wages. Of the total number of employees recorded for 1935, twenty-three, receiving \$11,821, were engaged in New Brunswick plants.

Corundum.—Corundum mining practically ceased in Canada with the commercial production of artificial abrasives by the electric furnace. The last recorded output of the mineral in the Dominion was in 1921 when grain corundum amounting to 403 tons valued at \$55,965 was exported to the United States. Corundum crystals are found in an area including several townships in Renfrew and Hastings counties in the province of Ontario. The commercial production of corundum began in this part of Ontario about 1900 with shipments reaching a maximum in 1906.

Production of corundum is now almost entirely confined to the Transvaal, in the Union of South Africa, where the output totalled 4,775 tons valued at £36,552 in 1935 as compared with 3,202 tons worth £23,844 in 1934. The 1935 annual report of the Department of Mines for the Union of South Africa contains the following particulars: "A large number of small scale tests on concentration methods in connection with the treatment of plumasite have been carried out, the results of which confirm the view that careful gravity concentration is the only method so far available for the treatment of this material. However, varieties from different localities have been found to vary considerably in amenability to treatment, and in some cases, notwithstanding the occurrence of large crystals of corundum, it is only possible to recover a small percentage as "crystal," owing to the impossibility of detaching feldspar from corundum simply by coarse crushing. In such cases, the necessity for fine crushing removes the concentrate from the category of "crystal" into that of "grain" of lower value. "Boulder" corundum has hitherto been exported as such, the preparation for market by crushing and grading having been done overseas. In order to test the possibility of exporting graded products, samples aggregating over half a ton in weight have been prepared and forwarded oversea for use of the Union's special representative. In connection with the preparation of non slipping step treads, a number of cement steps in the University grounds have been constructed of mixtures incorporating several grades

of crushed corundum in order to observe the behaviour in service. Certain tests of crushed corundum as refractory material have also been made." Apparently the only regular established market of any consequence is that for crystal corundum in the United States.

The greater portion of the corundum mined is used normally in the manufacture of abrasive wheels. The lens and optical grinding trades also utilize some of the mineral in the form of fine flour or grain.

The higher grades of emery, a mixture of magnetite and corundum, comes largely from Asiatic Turkey and Greece; emery powder is consumed chiefly in the surfacing of plate glass and in the manufacture of abrasive cloth, grinding compounds and polishing and grinding wheels.

No imports or exports of corundum were reported in Canada during either 1934 or 1935. Imports of emery in bulk, crushed or ground, totalled \$42,102 in 1935 as compared with \$40,709 in 1934. Imports of sandpaper, glass, flint and emery paper or emery cloth amounted to \$114,617 in 1935 as against \$92,046 in the preceding year.

"Metal and Mineral Markets," New York, quoted emery, October, 1936—per ton, f.o.b. New York, domestic crude ore, first grade, \$10. Other American ore, delivered to grinders, per gross ton, \$16; Turkish and Naxos ore, \$30 to \$40. F.O.B. Pennsylvania, in 350 pound kegs Turkish and Naxos grain emery, 6½ cents per pound; Khasia, 6 cents; American, 4 cents.

Diatomite.—Diatomite or diatomaceous earth was produced during 1935 in the provinces of Nova Scotia, Ontario and British Columbia. Production in the Dominion for the year totalled 823 tons valued at \$33,140 as compared with 1,372 tons valued at \$54,910 in 1934. In Nova Scotia the International Diatomite Industries Ltd., conducted continuous operations throughout the year; the deposits of this company are located at New Annan and Digby neck; the crude material was calcined in 1935 at the New Annan plant of the company.

The Department of Mines, Ottawa, reported that prospecting in Southern New Brunswick revealed more diatomite ponds, some of which contain muds capable of producing high quality calcined diatomite.

In Ontario several companies were active in the Muskoka district during 1935 and a new treatment plant was erected at a bog south of Gravenhurst.

The diatomite deposit located at Quesnel in British Columbia and formerly operated by B. C. Refractories was not worked in 1935, and production for this province in 1935 represented shipments from stock. During the year a small quantity of diatomite mud from the Burnaby Lake deposit was treated in an experimental plant located in Vancouver.

The Department of Mines, Ottawa, also reports that more Canadian diatomite was used in the home industries during 1935 and the demand as a filter-aid, both for sugar and for use in cleaning establishments, increased; approximately 90 per cent of the diatomite now being consumed in Canada is in the form of filter-aids, while about 8 per cent is used for insulation purposes and the remainder is absorbed as a filler, concrete admixture, silver polish base, and in chemicals. Deposits containing medium quality diatomite are very common in some parts of Canada; owing, however, to foreign competition and, at present, to the comparatively small Canadian demand, only the properly prepared diatomite of the highest quality can be successfully marketed on a scale sufficiently large to warrant the operation of a property and the erection of a plant. The present price in Canada varies from \$35 to \$40 per ton for concrete admixture; \$35 to \$75 for insulation and filtration; up to \$200 in small lots for material suitable for polishes; imported insulation bricks vary from \$85 to \$140 per 1,000 according to grade and density. "Metal and Mineral Markets," New York, quote diatomite in United States, October, 1936; per long ton, f.o.b. Nevada, dried crude, in bags, \$12; 40 mesh, \$18; 200 mesh, \$30; low temperature insulation, \$20; high temperature, \$38.

Imports of diatomaceous earth or infusorial earth (Kieselguhr), ground or unground, into Canada during 1935 totalled 38,470 cwt. valued at \$56,832 as compared with 24,832 cwt. worth \$39,315 in 1934; of the 1935 imports 37,853 cwt. came from the United States. Statistics pertaining to exports are not available.

Garnets.—Garnets have not been commercially produced in Canada for some years. During 1935 a garnetiferous rock, crushed and screened at a mill near Labelle, Quebec, was marketed for sandblasting. Garnet is employed chiefly in the manufacture of abrasive paper and cloth while small quantities are utilized in the grinding of plate glass and other products.

It was reported in the United States in 1934 that several of the coated abrasive manufacturers were heat treating the garnet grain to increase its efficiency.

No imports of garnet described as such were recorded in Canada during 1935, the mineral, however, may enter in the form of abrasive paper, etc.

Abrasive garnet sold or used by producers in the United States totalled 2,591 short tons valued at \$214,815 in 1934.

"Metal and Mineral Markets," New York, quoted garnet, October, 1936: per ton f.o.b. New Hampshire mines; concentrate, \$30; grain, \$80 to \$140. New York: Adirondack garnet concentrates, \$85. Spanish grades, \$60, C. I. F. port of entry.

Grinding Pebbles.—No shipments of Canadian pebbles suitable for use as grinding material have been reported since 1926; during that year 64 tons were shipped from deposits occurring on the north shore of Lake Superior near Jackfish. In the United States, cut cubes and tube mill liners are made from quartzite at Jasper, Minn. One of the principal consumers of flint pebbles is the ceramic industry where products, usually of a minimum iron content, are desired.

Imports of flint and flint stones into Canada totalled 45,549 cwt. valued at \$24,014 in 1935 as compared with 46,802 cwt. worth \$28,427 in 1934. Of the 1935 imports 35,900 cwt. valued at \$15,741 came from France.

Grindstones, Pulpstones and Scythestones.—Shipments of grindstones, pulpstones and scythestones from Canadian quarries in 1935 totalled 708 tons valued at \$34,010 as compared with 987 tons worth \$46,478 in 1934.

The only operator producing finished grindstones in Canada during 1935 was the Read Stone Company, Sackville, N.B.; crude stone employed by this company was obtained from Quarry Island, Pictou county, Nova Scotia, and from the vicinity of Stonehaven, New Brunswick.

Crude sandstone quarried by E. A. Smith at Shediac, Westmorland county, New Brunswick, was exported to the United States and pulpstones were shipped in New Brunswick from the property formerly operated by the Miramichi Quarry Company; in British Columbia pulpstones were produced by the J. A. and C. H. McDonald Co., Vancouver, from stone obtained at a new quarry located on the northwest end of Gabriola Island, near Nanaimo. Scythe or sharpening stones were produced in New Brunswick by the Read Stone Co. and E. A. Smith.

According to a report (No. 773) issued by the Mines Branch, Department of Mines, Ottawa, the large size Canadian Grindstones are mainly used for sharpening pulp-mill and tobacco knives, and in the United States are used in the file, machine-knife, granite tool, and shear manufacturing industries. The small stones are used for scythe and axe grinding; there is a demand for good pulpstones, particularly for use in the large magazine grinders, but as known deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used in Canadian pulp mills is being produced in the Dominion; the artificial pulpstones made of silicon carbide segments and also more recently of fused alumina segments are gradually but surely replacing the natural stone.

Volcanic Dust (Pumicite).—Shipments of volcanic dust in Canada totalled 31 tons valued at \$620 in 1934 as compared with 118 tons worth \$2,360 in 1933. Most of the production during 1934 came from Williams Lake, British Columbia and was for use as an oil filtering medium. There was no production of volcanic dust in the Dominion during 1935. The material was also mined for some years from deposits occurring near Waldeck, situated a few miles east of Swift Current, Saskatchewan.

Volcanic dust has been successfully used as a cold water calcimine, as a cleanser, as a glass and metal polish, as a hand cleanser, and as a sweeping compound.

No imports of volcanic dust, described as such, were reported during recent years, however, imports of pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground, were valued at \$30,971 in 1935 as compared with \$25,142 in 1934.

Consumption of tripoli in Canada for foundry purposes totalled 84 tons valued at \$2,468 in 1935 as compared with 105 tons worth \$3,774 in 1934.

Table 229.—Capital Employed in the Natural Abrasives Industry in Canada, 1934 and 1935

	1934	1935
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—		
(a) Present cash value of the land (excluding minerals).....	197,637	12,750
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		65,287
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	10,565	2,800
(d) Inventory value of finished products on hand.....	8,935	10,550
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	17,639	22,727
Total.....	234,776	114,114

Table 230.—Employees, Salaries and Wages in the Natural Abrasives Industry in Canada, 1934 and 1935

	1934				1935			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	6		6	5,208	7		7	6,740
Wage earners.....	28		28	15,372	35		35	18,395
Total.....	34		34	20,580	42		42	25,135

Table 231.—Wage-Earners, by Months, in the Natural Abrasives Industry, 1935

Month	No.	Month	No.
January.....	6	July.....	51
February.....	2	August.....	56
March.....	3	September.....	59
April.....	27	October.....	57
May.....	49	November.....	40
June.....	51	December.....	22

Table 232.—Production (Sales) of Natural Abrasives in Canada, 1934 and 1935

Province	Diatomite		Grindstones, Pulpstones and Scythestones		Volcanic Dust	
	Tons	\$	Tons	\$	Tons	\$
1934						
Nova Scotia.....	1,320	52,800	50	1,762		
New Brunswick.....			535	27,091		
Ontario.....	46	1,920				
Saskatchewan.....					1	20
British Columbia.....	6	190	402	17,625	30	600
Total.....	1,372	54,910	987	46,478	31	620
1935						
Nova Scotia.....	666	26,660	50	2,006		
New Brunswick.....			456	21,175		
Ontario.....	100	4,600				
Saskatchewan.....						
British Columbia.....	57	1,880	202	10,829		
Total.....	823	32,140	708	34,010		

Table 233.—Production of Diatomite in Canada, 1926-1935

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....			1931.....	1,610	32,789
1927.....	266	6,650	1932.....	1,496	29,509
1928.....	368	8,960	1933.....	1,789	36,648
1929.....	429	10,330	1934.....	1,372	54,910
1930.....	554	13,247	1935.....	823	33,140

NOTE.—For years 1896 to 1925, see previous reports.

Table 234.—World Production of Diatomaceous Earth, 1933-1935

(Supplied by Imperial Institute—London)

(Long tons)

Producing Country	1933	1934	1935
BRITISH EMPIRE			
Northern Ireland.....	3,998	5,269	4,893
Canada.....	1,597	1,225	735
Barbados.....	10	2	10
Australia.....	2,825	3,355	3,106
Union of South Africa.....			169
FOREIGN COUNTRIES			
Denmark (moler).....	21,000	40,000	47,200
Finland.....	620	626	984
France.....	7,100	6,900	(a)
Germany.....	(d) 4,483	(e) 4,255	(e) 5,827
Hungary (exports).....	1,246	1,411	1,376
Italy.....	1,919	2,264	3,007
Norway (exports).....	221	84	140
Portugal.....		228	4,413
Spain (estimated).....	3,300	2,200	(a)
Sweden.....	640	1,102	1,207
Algeria.....	10,826	9,772	11,200
United States (b).....	72,721	72,721	72,721
Chile.....	1		(a)
Japan.....	14,371	13,300	(a)
Korea.....	2,994	(a)	(a)
Netherlands East Indies.....	40	95	88
Roumania (c).....	(a)	512	(a)

Diatomaceous earth is also produced in U.S.S.R. (Russia).

(a) Information is not available.

(b) Annual average production for years 1933-1935.

(c) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(d) Exports.

(e) Production of Hessen only.

Table 235.—Production of Grindstones in Canada, by Provinces, 1926-1935

(For the years 1886 to 1925, see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		British Columbia		Canada	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
1926.....	311	15,136	1,202	43,850			1,513	58,986
1927.....	11	220	1,306	47,255			1,317	47,475
1928.....			1,250	45,901			1,250	45,901
1929.....	6	110	1,032	37,291			1,038	37,401
1930.....	6	110	229	9,764			235	9,874
1931.....			198	8,164			198	8,164
1932.....	12	433	188	8,903			290	9,336
1933.....	21	868	140	6,211			161	7,079
1934.....	50	1,762	303	12,781			353	14,543
1935.....	50	2,006	456	21,175	202	10,829	708	34,010

Table 236.—Production of Pulpstones and Sharpening Stones in Canada, 1926-1935

Year	Pulpstones		Sharpening stones		Year	Pulpstones		Sharpening stones	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1926.....	1,155	89,541	27	2,700	1931.....	342	27,305	81	2,634
1927.....	911	75,242	23	2,300	1932.....	60	3,500	68	2,899
1928.....	581	52,659	24	2,400	1933.....	214	9,870	123	4,970
1929.....	754	62,336	155	6,617	1934.....	523	27,225	111	4,710
1930.....	573	49,897	22	2,250	1935.....	288	14,109	47	5,400

Table 237.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1932-1935

Year	Number for 2 ft. wood	Value	Number for 2-5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1932.....	210	65,450	139	46,436	222	249,373
1933.....	321	98,475	95	31,945	199	223,635
1934.....	378	103,811	84	29,680	268	292,359
1935.....	417	116,501	52	20,297	237	243,806

(2) The Artificial Abrasives and Abrasive Products Industry

The value of artificial abrasives and abrasive products manufactured in Canada during 1935 was 17 per cent greater than in 1934 and higher than in any other year on record except 1929. The gross factory value in 1935 was \$8,643,930 compared with \$7,414,853 in 1934, \$3,550,456 in 1933 and \$8,961,951 in 1929.

Fifteen establishments were in operation in 1935, 14 being in Ontario and 1 in Quebec. The average number of employees was 976 and payments in salaries and wages totalled \$1,314,272. Expenditures for manufacturing materials amounted to \$2,684,406 and a further \$782,553 was paid out for fuel and electricity. Capital employed totalled \$5,281,916 of which \$2,766,689 represented the present value of plants and equipment.

Artificial abrasives were made in 6 works located near the power centres of Niagara Falls and Shawinigan Falls; 3 of these establishments made only fused alumina 1 made only silicon carbide and 2 made both fused alumina and silicon carbide. The output of these works was valued at \$7,188,672 including 18,475 tons of silicon carbide and 51,194 tons of fused alumina worth \$6,523,676 and other products and by-products such as ferrosilicon, firesand, fused magnesite, refractory brick and cements, boron carbide and boron carbide shapes, artificial graphite, fused silica, etc.

Abrasive products such as wheels, paper, cloth, pulpstones and sharpening stones were manufactured in 10 different plants in 1935; 8 of these made wheels, segments, files, etc. and 2 made abrasive cloth and paper. The production of wheels and segments was valued at \$785,777 in 1935.

Imports of abrasives of all kinds advanced to \$2,577,540 in 1935 from \$2,208,791 in 1934, and exports increased to \$3,992,615 from \$3,951,910 in the previous year. The chief import item was black diamonds and diamond dust for borers which amounted to \$1,578,503 in 1935. Imports of crushed or ground artificial abrasives were valued at \$454,818 in the same year. Exports consisted almost entirely of crude silicon carbide and fused alumina as these materials are not further prepared in Canada but are shipped to the United States for grinding and grading

Table 238.—Artificial Abrasives Manufactures, 1934 and 1935

Products	Unit of measure	1934		1935	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Crude silicon carbide.....	ton	16,398	1,858,746	18,475	1,788,657
Fused alumina.....	ton	44,596	3,955,837	51,194	4,735,019
Refractories (silicon carbide, firesand, etc.).....	ton	1,383	33,515	2,249	42,703
Abrasive wheels and segments.....	xx		569,764		785,777
Sharpening stones and files.....	xx		62,929		83,013
Other products(*).....	xx		934,062		1,208,761
Total	xx		7,414,853		8,643,930
Number of firms.....		14		15	

(*) Includes ferrosilicon, abrasive cloth, abrasive paper, tiles, artificial pulpstones, graphite, boron carbide, boron carbide shapes, fused magnesite, refractory cements, firebrick, adhesive tape, fused silica, periclase, etc.

Table 239.—Imports into Canada and Exports of Abrasives in 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS				
Artificial abrasives in bulk, crushed or ground, when imported for use in the manufacture of abrasive wheels and polishing composition.....		306,377		454,818
Diamond dust or bort, and black diamonds for borers.....		1,395,404		1,578,503
Emery in bulk, crushed or ground.....		40,709		42,102
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives.....		103,630		76,246
Grinding stones or blocks manufactured by the bonding together of either natural or artificial abrasives.....		10,366		9,253
Grindstones, not mounted, and not less than 36 inches in diameter... No.	1,024	140,327	1,089	140,208
Grindstones, n.o.p..... No.	4,056	4,491	3,683	4,015
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		25,142		30,971
Sand paper, glass, flint and emery paper or emery cloth.....		92,046		114,617
Iron, sand or globules, or iron shot, and dry putty, adapted for polishing glass or granite or for sawing stone.....		12,642		26,359
Manufactures of emery or of artificial abrasives, n.o.p.....		38,342		43,616
Diatomaceous earth or infusorial earth (kieselguhr), ground or unground..... Cwt.	24,832	39,315	38,470	56,832
Total.....		2,208,791		2,577,540
EXPORTS				
Grindstones, manufactured.....		4,947		74
Abrasives—				
Natural, n.o.p., in ore or bulk, crushed or ground (*).....Cwt.	26,434	33,512	11,128	15,501
Artificial, crude, including silicon carbide.....Cwt.	1,267,651	3,869,613	1,401,635	3,925,364
Artificial, made up into wheels, stones, etc.....Cwt.		43,838		51,676
Total.....		3,951,910		3,992,615

(*) Including infusorial earth, rotten stone, tripoli, etc.

THE ASBESTOS MINING INDUSTRY

Finally revised statistics relating to Canadian asbestos production during the calendar year 1935, indicated a decided improvement in the industry during the year under review. The output of all grades of the mineral totalled 210,467 short tons valued at \$7,054,614 as compared with 155,980 tons worth \$4,936,326 in the preceding year. Increases in both quantity and value were recorded for all grades including crudes, fibres and shorts; the tonnage of rock mined totalled 2,852,118 as compared with 2,320,750 in 1934 while rock milled amounted to 2,256,994 tons as against 1,935,129 tons in 1934. The asbestos mines and mills in 1935 provided employment for 2,072 persons and distributed \$1,904,053 in salaries and wages as compared with a distribution of \$1,608,812 to 1,855 employees in 1934.

The value of all Canadian asbestos exports, including manufactures of same, totalled \$7,061,109 in 1935 representing a 34 per cent increase over 1934; the products of Canadian asbestos mines now find a world-wide market, going in 1935 to the United Kingdom, United States, Australia, Belgium, France, Germany, Italy, Japan, and various other countries. Canadian asbestos is of the chrysotile or serpentine variety and of excellent quality; in 1935 commercial production was confined to the Eastern Townships, Quebec. Fibrous minerals similar to asbestos have been reported from other localities in Canada.

According to the Department of Mines, Ottawa, explorations and developments on the properties of the operating companies have disclosed reserves of ore sufficient for many years to come. The recent application of block-caving methods in one of the larger Canadian asbestos mines has resulted in remarkable reductions in mining costs, in improved mill feed, and in improved working conditions.

The Bureau of Mines, Quebec, in reviewing the industry in that province for 1935 states that although there were no new developments of a pronounced nature, the year witnessed a most decided recovery in production, the shipments in 1935 being the highest in both quantity and value since 1930. Several of the larger mines operated continuously throughout the year and mill extensions were reported by three companies. Stripping operations were conducted on deposits located in the Asbestos, Black Lake and the Thetford areas.

One of the more interesting events in the industry during the year was the development work conducted in Bannockburn township, Ontario, by Rahn Lake Mines Corporation; about 400 tons of mill rock asbestos ore were placed on the stock pile; this was reported to contain a high quality fibre and to average from \$8 to \$10 per ton.

Some Notes on Asbestos Research being done at National Research Laboratories, Ottawa

(D. WOLOCHOW AND A. VAN WINSEN)

The evaluation of milled asbestos fibre, particularly of the spinning grades, has been one of the chief problems under investigation. Several methods for measuring some of the physical characteristics which may affect the relative values of spinning fibres of varying texture have been developed and a large number of samples have been tested. Towards the end of the year there was obtained a laboratory-size carding machine which should facilitate this study. The work conducted to date has embraced full-scale factory spinning tests. The study gives promise not only of providing a fuller understanding of the various factors which determine the behaviour of a given mass of asbestos fibre, but also of suggesting improvements in the milling methods and the machines used to extract fibre from asbestos rock.

Further work on the separation of magnetic iron from asbestos indicates that the removal of this undesirable constituent is feasible and means for achieving this are under consideration.

Among other matters studied were: (a) weathering resistance of asbestos, (b) behaviour of metals when in contact with asbestos fibre, (c) the effect of asbestos insulation on heating coils, (d) comparative composition of crude asbestos from different sources, (e) methods of treating asbestos with tars, resins, etc., in order to produce light-weight, water-shedding bonded material, (f) recovery of fibre from asbestos tailings and utilization of tailings.

GENERAL REVIEW

United States.—(Supplied by the United States Bureau of Mines).—"Production of asbestos in the United States amounted to 9,415 short tons in 1935 compared with 6,544 tons in 1934, an increase of about 44 per cent. That sold or used by producers in 1935 amounted to 8,920 tons valued at \$292,927, an increase of about 75 per cent in quantity and 85 per cent in value over 1934. Most of that sold or used by producers was short fibre chrysotile from Vermont, although small sales of Arizona crude were recorded. Small quantities of amphibole were mined in Maryland and Montana.

"Imports of unmanufactured asbestos amounted to 166,585 tons valued at \$5,125,413, a gain of about 38 per cent in quantity and nearly 52 per cent in value compared with 1934. Exports, which are always small, were only 850 tons valued at \$87,896. Apparent consumption in 1935 (domestic fibre used plus imports, minus exports) was 174,655 tons valued at \$5,330,444, a gain of 41 per cent in quantity and 55 per cent in value over 1934.

"The United States leads all countries in the manufacture of asbestos products, but domestic asbestos mines furnish only 2 to 5 per cent of the country's requirements of raw asbestos. The following table shows the quantity, value and origin of asbestos imported into the United States in 1935:—

Table 240.—Asbestos (unmanufactured) imported for Consumption in the United States in 1935 by Countries and Classes(*)

Country	Short tons	Value
		\$
Africa, British—		
Union of South Africa.....	945	121,577
Other British.....	1,183	172,654
Canada.....	154,236	4,486,112
Finland.....	11	446
Italy.....	545	16,666
Malta, Gozo and Cyprus.....	4,628	87,844
Morocco.....	22	2,131
U.S.S.R. (Russia).....	4,813	214,532
United Kingdom.....	202	23,451
Total—1935.....	166,585	5,125,413
Total—1934.....	120,334	3,377,994

(*) Figures on imports and exports compiled by M. B. Price, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Union of South Africa.—(Department of Mines, Union of South Africa.)—The Inspector of Mines, Pretoria, reported that several new asbestos concerns commenced work in the Pietersburg district during 1935. Sales effected during the year amounted to 20,400 tons as compared with 14,783 tons in 1934.

The Inspector of Mines, Bloemfontein, stated that the asbestos industry in that section is capable of considerable expansion if the demand warrants it. The demand, however, was weak during the year, and during the latter months showed no improvement. In view of this, restriction of output was required. As the smaller producers, who eke out a bare existence, cannot be expected to share in this restriction, it is practised solely by the large producers, some of whose mines are now working to one-third capacity. These companies buy the products of the smaller producers and, as the export trade is in capable hands, no inferior quality is placed on the market.

"The classification of Chrysotile sold was as follows:—

	Tons
Crude No. 1.....	87·700
Crude No. 2.....	1·700
Crude—Run of Mine.....	128·500
Spinning Fibre.....	1,108·125
Single Fibre.....	8,424·300
Paper Stock.....	4,760·850
Millboard Stock.....	1,108·495
Fillers.....	22·000
Floats.....	....
Total.....	15,641·670

Southern Rhodesia.—The correspondent of "The Mining Journal"—London, reports in May, 1936, on the position of the Rhodesian asbestos industry as follows: "The news that the Rhodesian and General Asbestos Corp., is installing a large water-filtration plant at the company's pumping station on the Lundi River, which will be of immense value to the Shabanie mine and the residents of Shabani, serves to call attention to the improved state of the asbestos industry in the Colony . . . The Southern Rhodesian ore contains a large amount of spinning fibre, in which respect it is unique. The class of fibre known as "shingles" when separated from the raw material, is of a clean and crisp quality, and on this account its value in the manufacture of asbestos cement products is higher than elsewhere. Unfortunately the market for the

Rhodesian product is confined to the grades mentioned, because heavy railage rates and freights prevent the shipment of "shorts" to compete in the world's markets. As things are, there is not much likelihood of the sales output exceeding 50,000 tons per annum unless the Government provides facilities to make it possible to reduce costs to enable the lower grades of the mineral to be exported."

Russia.—Comparatively little information is available relating to Russian asbestos production. A circular issued by the United States Bureau of Mines contains the following information:—"A large new mill designed to handle 2,000,000 tons of rock annually and produce 80,000 tons of fibre in six grades was nearing completion in 1934. This mill will give Russia a total milling capacity of approximately 175,000 tons of fibre a year.

"Estimates made in 1931 indicated that fibre a third of an inch or more in length constituted about 30 per cent of the total output. Since that date, with increasing factory capacity for the manufacture of asbestos products, probably a larger proportion of the shorter grades is produced. Grades entering the German market in 1929 were designated as follows:—Grade 0, $1\frac{1}{2}$ inch or longer; Grade 1, $\frac{3}{4}$ inch to $1\frac{1}{2}$ inch; Grade 2, $\frac{5}{8}$ to $\frac{3}{4}$ inch; Grade 3, $\frac{3}{8}$ to $\frac{5}{8}$ inch; Grade 4, $\frac{1}{8}$ to $\frac{3}{8}$ inch, and Grade 5, less than $\frac{1}{8}$ inch.

The following information, taken from "ASBESTOS"—Philadelphia, was supplied by the U.S.S.R. Industrial Export Corporation. Total exports of asbestos from Russia during 1935 totalled 27,677 short tons divided as to countries:—

To Europe.....	21,597 short tons
To United States.....	3,416 "
To Japan.....	2,664 "

Divided as to grade:—

Crude (fibre not less than $\frac{3}{4}$ inch).....	60 "
Mill fibre.....	27,485 "
Shorts and waste.....	132 "

Cyprus.—"Milled asbestos (Chrysotile) in Cyprus is graded into three classes—standard, shorts and fines. The standard grade, designated "shingle stock" is said to include about 75 per cent of the production. The entire output is exported. Twelve mills were reported in operation in 1935. Their aggregate capacity is 25,000 tons of fibre a year of six working months. They are operated only in the dry season." (United States Bureau of Mines).

The March issue of "ASBESTOS" reported that the sale of the Cyprus Asbestos Mines to the Tunnel Asbestos Cement Company was confirmed at the meeting held on February 10th. Prior to the negotiations which resulted in the agreement, the Tunnel Portland Cement Company had decided to manufacture and sell asbestos cement, and, with this in view, had ordered the erection of the necessary new buildings and plant on a site at West Thurrock (England) adjoining its existing Portland cement works.

Germany.—"Hamburg has been for many years the centre of German and, according to local experts, European, trade in asbestos.

"The general agreement between the net receipts of asbestos in Hamburg (27,519 tons) and total German imports (21,885 tons) indicate the leading position of this port in the German trade in asbestos.

"Since there is no commercial production of asbestos in Germany, and re-exports are negligible, the country's annual consumption is practically identical with net imports, except for fluctuations in the accumulation of stocks, which are usually unimportant. Therefore, the consumption of asbestos may be considered as increasing from 7,582 tons in 1932 to 21,885 in 1935. A steadily increasing demand for asbestos in recent years in Germany has stimulated imports and helped to maintain a firm market. Prices have varied little, being often fixed for 1 year in advance, and contracts are usually made to cover annual deliveries. The industries consuming the product are scattered over northern, middle, western and southern Germany. Hamburg accounts for several large factories manufacturing asbestos products." (Taken from the March issue of "Foreign Metals and Minerals"—Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington).

Czechoslovakia.—"The output of the sole producer of asbestos in Czechoslovakia, "Asbest" Gewinnung und Verwertung von Asbest, Gesellschaft m.b.H., Dobsina, amounted to 2,600

metric tons in 1935, as against 2,100 in 1934 and 1,200 in 1933. As the annual minimum domestic consumption is estimated at around 6,500 tons, considerable quantities are necessarily imported. Official statistics indicate that imports in 1935 totalled 3,403 metric tons as compared with 4,938 in 1934. Russia was the chief supplier in both years, shipping 1,035 tons in 1935 and 1,620 in 1934. Shipments from British West Asia dropped from 1,115 tons in 1934 to only 41 in 1935. South Africa ranked second in the 1935 trade, accounting for 792 tons, followed by Canada with 725. The United States supplied 42 tons in 1935 as against 4 in the previous year. Asbestos was exported from Czechoslovakia to the amount of 364 tons in 1935 against 516 in 1934." (Taken from the April issue of "Foreign Metals and Minerals"—Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington).

Uses

The consumption of asbestos in industry is ever growing and its diversified employment steadily expanding throughout the world. Spinning fibre is utilized in the manufacture of theatre curtains, blankets, clothing, conveyor belts for carrying hot materials, tape, rope, gaskets, clutch facings, brake-band linings and a variety of other manufactures.

Large quantities of the non-spinning fibre are consumed in the production of roofing materials and asbestos paper for pipe coverings, heaters, automobile mufflers, etc. Cement and asbestos compressed in sheets is utilized extensively as millboard, floor tile, corrugated sheeting, lumber, and as lining for electric switch boxes, garages, safes, etc. Non-corrosive, acid resisting pipes made of cement and asbestos are being employed extensively for water and gas mains and sewers. A standard European pipe consists of 80 per cent cement and 20 per cent asbestos. Large quantities of short fibres are consumed in the manufacture of plastic fireproof cements used for boiler, pipe and furnace lining. Short fibres are also used in fireproof paints and as a constituent of asphalt-roofing coatings.

The following information relating to some of the more recent and interesting applications of asbestos was supplied by "ASBESTOS"—Philadelphia:—

"Asbestos is playing an increasing part in the very active campaign that is being waged in London against traffic noise.

"The London Passenger Transport Board, which controls all London bus, street car and subway services, is employing asbestos in a variety of ways as a sound-deadener and success has been such as to warrant a continuation of the research into the material's silencing properties.

"Many of the tunnel walls of the London subways have been lined with asbestos mats up to the level of the floor of the train, and this has resulted in a surprising diminution of noise. At first it was feared that the asbestos mats might lose their sound-absorbing qualities through the accumulation of dust, but after a month or so of use it has been found that the dust deadens noise rather than reproduces it.

"An experiment now in progress is with "skirted" wheels for subway trains. Engineers are devising a system of cowling for the wheels which, if successful will be generally introduced. This "skirting" is of metal and one of the suggestions put forward is to line it with asbestos.

"At the close of 1935 a 'triple insulated' house was completed and exhibited in the United States. This house is of much interest to the asbestos industry as it is built with the idea of incorporating asbestos materials in its construction wherever possible. The exterior of the house is asbestos-cement shingles, both walls and roof are insulated with rock wool while the interior walls are plaster applied over steel wire mesh attached to a fibrous backing—therefore the "triple insulated." The chief object in the building of this house is to bring sturdy, lasting construction of homes within the reach of the average citizen. The house is not "modern" nor "freakish" in appearance, but is of the colonial type of home of moderate cost and most attractive."

Table 241.—Capital Employed in the Asbestos Industry in Canada, 1933-1935

	1933	1934	1935
	\$	\$	\$
1. Capital employed as represented by:			
(a) Present cash value of the land (excluding minerals).....	18,127,332	18,211,468	4,085,982
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....			10,053,706
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	389,714	429,551	448,335
(d) Inventory value of finished products on hand.....	894,059	1,371,714	1,208,876
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	1,698,862	1,803,617	1,008,684
Total.....	21,109,967	21,816,350	16,805,583

Table 242.—Employees, Salaries and Wages in the Asbestos Industry in Canada, 1934 and 1935

	1934				1935			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
Salaried employees.....	125	22	147	\$ 281,493	127	25	152	\$ 302,151
Wage-earners—								
Mine.....	770		770		815		815	
Mill.....	938		938		1,105		1,105	
Total.....	1,708		1,708	1,327,319	1,920		1,920	1,601,902
Grand total.....	1,833	22	1,855	1,698,812	2,047	25	2,072	1,904,052

Table 243.—Number of Wage-Earners on Pay Roll in Asbestos Mining Industry, by Months, 1933-1935

Month	1933	1934	1935
January.....	1,218	1,577	1,605
February.....	1,048	1,587	1,650
March.....	1,016	1,595	1,640
April.....	1,119	1,587	1,739
May.....	1,399	1,780	1,813
June.....	1,392	1,928	1,938
July.....	1,543	1,902	2,036
August.....	1,564	1,806	1,953
September.....	1,920	1,623	1,957
October.....	2,059	1,688	2,148
November.....	1,819	1,762	2,237
December.....	1,754	1,653	2,304

Table 244.—Sales and Shipments (*) of Canadian Asbestos, 1933-1935

	1933		1934		1935	
	Tons	Value	Tons	Value	Tons	Value
Crudes.....	1,306	\$ 341,734	1,663	\$ 409,853	2,278	\$ 539,558
Fibres.....	82,605	3,843,887	77,465	3,456,399	102,270	4,873,255
Shorts.....	74,456	1,025,556	76,852	1,070,074	105,919	1,641,801
Total.....	158,367	5,211,177	155,980	4,936,326	210,467	7,054,614
Sand, gravel and stone (waste rock only) (a)	6,445	3,215	4,672	3,480	3,025	2,053

	1933	1934	1935
	Tons	Tons	Tons
Quantity of rock mined.....	1,566,919	2,320,750	2,852,118
Quantity of rock milled.....	1,329,814	1,935,129	2,256,994
Quantity of tailings retreated.....	521,930		

(*) All from the province of Quebec.

(a) This production is included under the sand and gravel industry.

Table 245.—*Production of Asbestos in Canada, 1926-1935

(For the years 1880 to 1925, see Mineral Production of Canada, 1928)

Year	Short tons	Value	Year	Short tons	Value
1926.....	279,403	\$ 10,099,423	1931.....	164,296	\$ 4,812,886
1927.....	274,778	10,621,013	1932.....	122,977	3,039,721
1928.....	273,033	11,238,360	1933.....	158,367	5,211,177
1929.....	306,055	13,172,581	1934.....	155,980	4,936,326
1930.....	242,114	8,390,163	1935.....	210,467	7,054,614

* Sales.

Table 246.—Imports of Asbestos into Canada, 1933-1935

Item	1933		1934		1935	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Asbestos in any form other than crude, and all manufactures of, n.o.p.....		233,966		408,020		420,469
Asbestos packing.....	79	54,148	83	64,713	60	56,208
Asbestos brake and clutch lining.....		165,994		218,052		235,620
Total.....		454,108		690,785		712,297

Table 247.—Exports of Canadian Asbestos, by Countries of Destination, 1933-1935

Commodity and Destination	1933		1934		1935	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
ASBESTOS—						
United Kingdom.....	4,633	303,492	4,618	316,468	4,584	290,569
United States.....	48,469	2,324,246	44,541	1,996,915	61,059	3,079,366
Australia.....	744	39,162	998	49,859	2,004	99,632
Belgium.....	5,051	275,046	3,548	191,519	4,814	270,606
France.....	2,620	167,832	3,969	243,416	3,781	254,142
Germany.....	4,572	306,713	5,435	441,188	4,913	438,062
Italy.....	1,647	94,047	618	58,090	806	74,435
Japan.....	9,530	422,252	18,489	679,723	15,597	628,597
Netherlands.....	1,088	50,333	734	35,800	1,671	110,725
Spain.....	343	14,976	162	7,887	710	37,328
Other countries.....	4	278	155	8,326	247	16,714
Total.....	78,701	3,998,377	83,267	4,029,191	100,186	5,300,176
SAND AND WASTE—						
United Kingdom.....	2,816	54,979	2,080	44,620	2,595	75,516
United States.....	63,744	869,994	68,171	964,429	92,810	1,440,995
Germany.....	1,666	32,222	2,497	50,787	1,438	28,805
Netherlands.....	377	7,220	579	11,541	700	14,776
Other countries.....	1,693	27,002	1,650	28,928	1,482	25,389
Total.....	70,296	991,417	74,977	1,108,305	100,025	1,585,481
ASBESTOS MANUFACTURES, INCLUDING						
ASBESTOS ROOFING—						
United Kingdom.....		37,420		91,501		119,878
United States.....		2,033		1,770		444
Newfoundland.....		2,125		5,245		6,345
Argentina.....		5,186		4,463		3,826
Other countries.....		26,280		37,847		44,950
Total.....		73,044		140,826		175,452

The Asbestos Products Industry in Canada

A total of 13 plants reported in this industry in 1935; 7 were located in Quebec, 5 in Ontario, and 1 in Nova Scotia. Capital employed in manufacturing operations amounted to \$1,703,301, the numbers of workers was 327, and salaries and wages totalled \$323,854. Purchased materials for manufacturing cost \$518,994.

Table 248.—Manufactures in Canadian Asbestos Products Industry, 1934 and 1935

Products	Unit of measure	1934		1935	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Asbestos brake linings.....	ft.	2,692,184	458,147	2,927,962	439,904
Asbestos boiler and pipe coverings.....	ft.	1,207,301	99,948	1,477,121	136,157
Asbestos clutch facings.....	No.	338,069	49,317	416,311	78,131
Asbestos gaskets and tape.....	lb.	38,775	21,058	46,289	24,501
Asbestos packings.....	lb.	196,627	78,860	229,724	107,824
Other asbestos products*.....			106,124		172,647
All other products†.....			97,529		171,118
Total.....			910,983		1,130,282

* Includes asbestos blackboards, millboard, paper, shingles, yarn, cement, dryer felts, etc.

† Includes packing of rubber, duck and flax; brass rivets, rock wool and eel grass insulation.

Table 249.—Materials Used in Canadian Asbestos Products Industry, 1934 and 1935

Materials	Unit of measure	1934		1935	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos fibre.....	lb.	4,844,692	66,524	5,321,075	75,147
Asbestos cloth and strips.....	lb.	36,291	15,703	47,121	19,233
Asbestos paper, corrugated or plain.....	lb.	48,183	2,771	350,623	14,940
Asbestos yarn.....	lb.	247,555	67,044	347,039	87,513
Portland cement.....	lb.	255,452	1,507	463,803	3,754
Cotton cloth, yarn and waste.....			10,397		37,647
Rubber.....	lb.	66,801	8,799	47,939	7,639
Containers, boxes, etc.....			30,071		41,168
All other materials.....			184,258		231,953
Total.....			387,074		518,994

Table 250.—World Production of Asbestos, 1933-1935

(Long tons)

(Supplied by Imperial Institute—London)

Producing country and description	1933	1934	1935	Producing country and description	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES			
Southern Rhodesia.....	26,948	28,762	38,034	Bulgaria.....		3	3
Union of South Africa—				Finland.....	2,311	3,629	(a)
Amosite.....	2,569	2,552	4,031	France.....	400	400	(a)
Blue.....	2,441	2,413	2,097	Greece.....	14	30	(a)
Chrysotile.....	10,175	11,186	12,105	Italy.....	3,215	2,216	(a)
Canada—				United States (sales).....	4,479	5,843	8,406
Chrysotile (b).....	147,153	143,439	190,618	Argentina.....			13
Crude.....	1,166	1,485	2,034	Brazil.....	97	(a)	(a)
Fibre.....	75,754	69,165	91,313	China.....	232	285	(a)
Shorts.....	66,479	68,618	94,570	Japan (estimated).....	1,000	1,000	1,000
Sand and gravel (waste rock only).....	5,754	4,171	2,701	Korea.....	12		6
Actinolite.....		27		Manchoukuo.....	104	(a)	(a)
Cyprus.....	3,494	7,081	7,493	Turkey.....	118	4	102
India.....		25	63	Czechoslovakia.....	1,200	2,100	2,600
Australia.....	279	170	170	U.S.S.R. (Russia).....	73,000	91,000	100,000
Total.....	193,000	196,000	255,000	Total*.....	86,000	107,000	119,000
				World's Total*.....	279,000	303,000	374,000

(a) Information not available.

(b) Sales and shipments.

FELDSPAR AND QUARTZ, MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and for this reason the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this report.

Feldspar

Production of feldspar in Canada during 1935 totalled 17,742 short tons valued at \$144,330 as compared with 18,302 tons worth \$147,281 in 1934. Of the output in 1935 Quebec contributed 7,002 tons valued at \$63,075; Ontario, 8,656 tons at \$75,003; and Manitoba, 2,084 tons worth \$6,252. Following the decrease recorded in 1935 the industry experienced a distinct improvement during the first half of 1936, production for this period totalling 7,867 tons valued at \$66,768 as against an output for the corresponding period of 1935 of 5,269 tons at \$48,125.

Employment in the industry declined from 312 in 1934 to 260 in 1935 together with a corresponding decrease in salaries and wages paid from \$50,888 to \$44,385.

Exports of feldspar in 1935 amounted to 9,959 tons valued at \$59,893 as compared with 10,532 tons worth \$65,158 in 1934 and of the 1935 exports 9,816 tons valued at \$56,003 were consigned to the United States. Imports of ground feldspar in both 1934 and 1935 came entirely from the United States, the imports in 1935 totalling 608 tons worth \$10,995 as against 917 tons valued at \$14,255 in 1934.

"Canada produces feldspar mostly of high-potash type averaging around 13 to 14 per cent K_2O . Spar of high soda content is relatively uncommon, and very few deposits of this grade have been worked. In 1935 several hundred tons of soda spar were shipped from a property in Sabine township, Bancroft district, Ontario.

"A development during the year that may extend the Canadian feldspar market, was the erection by Canadian Nepheline, Ltd. of a plant at Lakefield, Peterborough county, Ontario, for the treatment of nepheline syenite rock, extensive bodies of which occur in the nearby township of Methuen. The rock consists of a mixture of albite (soda feldspar), microcline (potash feldspar), and nepheline (a silicate of soda, potash and alumina), and has been shown to possess valuable ceramic properties. The product made will be of 20 mesh, intended for the glass trade." (Commercial shipments commenced in 1936).

"Feldspar prices remained around the 1934 level, ranging from \$6 to \$7 per ton for the best ceramic grade to \$4 for No. 2 quality, all f.o.b. rail. Both domestic grinding mills, that of Frontenac Floor and Wall Tile company at Kingston, Ontario, and that of Canadian Flint and Spar Company, at Buckingham, Quebec, operated throughout the year." (report 773—Department of Mines, Ottawa.)

The United States Bureau of Mines reported that all states producing crude spar in 1935 shared an increased output except Arizona and New York; the output of feldspar mined in California and Colorado nearly doubled in volume over that in 1934 and production in South Dakota jumped 140.5 per cent. Glass manufacture in the United States consumes more than half the output of ground feldspar; it is used primarily in this industry as a source of alumina. The United States feldspar industry, according to the United States Bureau of Mines, maintains grinding equipment greatly in excess of that required to supply current demands. The Bureau also remarks that a recent development affecting the feldspar industry is the use of nepheline syenite as a glass-batch constituent to replace feldspar wholly or in part.

Table 251.—Capital Employed in the Feldspar and Quartz Mining Industry, in Canada, 1933-1935

	1933	1934	1935
	\$	\$	\$
1. CAPITAL EMPLOYED AS REPRESENTED BY—			
(a) Present cash value of the land (excluding minerals).....	1,050,026	1,170,106	255,232
(b) Present value of buildings, fixtures, machinery, tools and other equipment..			729,895
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....			36,478
(d) Inventory value of finished products on hand.....	37,837	55,358	92,476
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	32,274	41,484	37,905
	23,655	43,234	
Total	1,143,792	1,310,182	1,151,986

Table 252.—Employees, Salaries and Wages in the Feldspar and Quartz Mining Industry in Canada, 1934 and 1935

	1934				1935			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	37	7	44	50,888	26	4	30	44,385
Wage-earners.....	268		268	154,620	230		230	138,407
Total.....	305	7	312	205,508	256	4	260	182,792

Table 253.—Number of Wage-Earners on Pay Roll in Feldspar and Quartz Mining Industry, by Months, 1933-1935

Month	1933	1934	1935
January.....	39	170	180
February.....	32	153	168
March.....	34	153	161
April.....	18	145	147
May.....	123	263	230
June.....	172	300	266
July.....	187	356	313
August.....	193	389	329
September.....	200	377	254
October.....	163	355	261
November.....	139	286	233
December.....	132	232	195

Table 254.—Production of Feldspar in Canada, by Provinces, 1926-1935

Year	Quebec		Ontario		Manitoba		Canada	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1926.....	13,168	111,136	22,783	199,102			35,951	310,238
1927.....	12,730	104,618	17,119	154,533			29,849	259,151
1928.....	12,943	104,789	18,954	180,153			31,897	284,942
1929.....	15,790	133,492	21,737	206,979			37,527	340,471
1930.....	17,074	163,802	9,722	104,667			26,796	268,469
1931.....	10,381	86,842	7,962	100,119			18,343	186,961
1932.....	3,390	39,062	3,657	42,920			7,047	81,982
1933.....	6,183	59,288	4,387	45,350	88	484	10,658	105,117
1934.....	9,207	78,853	7,302	61,665	1,793	6,763	18,302	147,281
1935.....	7,002	63,075	8,656	75,003	2,084	6,252	17,742	144,330

Table 255.—Imports and Exports of Feldspar, 1931-1935

	Imports*		Exports	
	Tons	\$	Tons	\$
1931.....	1,877	37,297	10,975	88,913
1932.....	1,487	24,875	2,017	15,465
1933.....	561	7,970	3,596	23,076
1934.....	1,039	15,245	10,532	65,158
1935.....	608	11,000	9,959	59,893

* Crude and ground.

Table 256.—Consumption of Feldspar in Canada, By Uses, As Reported Under The Census Of Manufactures, 1934 and 1935

	1934		1935	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Glass and cleaning powders.....	5,322	83,793	5,185	74,779
Abrasive products.....	25	688	34	930
Enamelling and glazing.....	1,733	35,158	2,717	51,521
Total accounted for.....	7,080	119,639	7,936	127,239

"Metal and Mineral Markets"—New York—published feldspar prices—December, 1935 as follows: per ton, f.o.b. North Carolina, potash feldspar, 200 mesh, white, \$17 in bulk; soda feldspar, \$19, f.o.b. Maine, potash feldspar, white 200 mesh, \$17 in bulk. Granular glass spar, white, 20 mesh, f.o.b. North Carolina, \$12.50 in bulk; semi-granular, \$11.75; soda feldspar, 200 mesh, white, \$19. Virginia: No. 1, 230 mesh, \$18; 200 mesh, \$17; No. 17 glassmakers, \$11.75; No. 18, \$12.50. Enamellers \$14 to \$16; quotations on spruce pine N. C. basis, New Mexico; Crude Clean No. 1 potash spar, \$4.75; ground, \$9.50.

Table 257.—World Production of Feldspar, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom				Germany (Bavaria only)...	4,419	6,700	5,860
China stone.....	33,462	47,993	57,160	Italy.....	4,794	7,516	7,496
Canada.....	9,516	16,341	15,841	Norway.....	18,292	25,194	22,370
Australia (including China stone).....	2,570	2,902	3,163	Roumania (b).....	1,288	1,010	(a)
India.....	677	628	702	Sweden.....	32,053	33,924	47,869
FOREIGN COUNTRIES				United States (sales).....	150,633	154,188	189,550
Czechoslovakia (estimated)	30,000	30,000	30,000	Argentina.....	370	424	487
Finland (exports).....	2,663	3,276	2,038	Egypt.....	59		71
				"Manchoukuo".....	5,500	5,000	(a)
				China.....	21,248	22,420	(a)

Feldspar is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

Quartz (Silica)

Production of natural silica, including crushed quartzite, silicious fluxing sand and gravel, lode quartz, crude and ground, and silica sand, totalled 233,002 short tons valued at \$424,882 in 1935 as compared with 272,563 short tons at \$482,265 in 1934. Production in 1935, as in the preceding year, came from the provinces of Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. Silica production during the first half of 1936 totalled 105,858 tons valued at \$228,248 as compared with 117,762 tons at \$207,921 for the first six months of 1935.

"The materials produced in this industry are:—quartz for smelter flux and ferro-silicon; quartzite for ferro-silicon and silica brick; silica sand for the manufacture of glass, carborundum, sodium silicate, flux, etc., also for sandblasting and for use in the steel foundries; silex, the finely pulverized silica used in ceramics and the paint industry.

"Quartz and quartzite in sizes from 2 to 6 inches are used in the manufacture of ferro-silicon and as a smelter flux. For silica brick, quartzite is crushed to about 8 mesh. Some quartz is also crushed to make silica sand.

"Silica sand is generally prepared from a friable sandstone by crushing, washing, drying, and screening to recover different grades. For example, for the manufacture of glass the material should range between 20 and 100 mesh. Silica sand is also prepared from a friable quartz and from vein quartz.

"Silex is the washed sand or pure quartz crushed and ground in some sort of ball mill, then either air- or water-floated to recover the fine flour. The ceramic industry requires 150 mesh or finer, while the paint trade requires air-floated material 250 mesh or finer.

"Quartz is produced in Quebec, Ontario and Manitoba; and quartzite is quarried in Nova Scotia, Quebec, Ontario, Manitoba, and British Columbia. Silica sand is obtained from Nova Scotia, Quebec, and Manitoba, and silex is prepared at one plant in the province of Quebec. A sand high in silica for smelting is produced in Saskatchewan and Ontario.

"The Canadian producers of silica sand are steadily improving their position and each year sees an increasing use of their products. Silica sand for use in the manufacture of glass and silicate of soda is at present largely imported; it has to be of a high degree of purity and uniformity, and if Canadian producers hope to supply this market they will have to adhere rigidly to the strict specifications and be able to guarantee regularity of shipments. The use of Canadian sand for sand blasting is increasing and the prospects are promising for a still further use of Canadian material. The price per ton for the several grades of silica varies greatly, depending on the purity and on the purpose for which the material is to be used; silica, on the whole, is a comparatively low-priced commodity."

(Report No. 773—Department of Mines, Ottawa.)

Table 258.—Production in Canada and Imports of Quartz and Silica Products, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION(*) (SHIPMENTS)—				
Nova Scotia.....	7,292	12,107	9,640	13,978
Quebec.....	57,208	229,817	51,948	226,839
Ontario.....	89,838	134,572	83,034	120,005
Manitoba.....	931	3,051	147	220
Saskatchewan.....	92,447	88,748	77,177	59,069
British Columbia.....	24,847	13,990	11,056	4,771
Canada.....	272,563	482,265	233,002	424,882
IMPORTS—				
Flint and ground flint stones.....	2,340	28,427	2,277	24,014
Silex or crystallized quartz, ground or unground.....	2,323	53,430	3,358	75,768
Silica sand for glass, carborundum and steel and filtration plants and sand blasting.....	96,165	226,188	123,577	282,936
Silica fire brick, 90 per cent silica.....		210,190		215,500

(*) Includes both crude and crushed quartz and quartzite, silica flux and natural silica sands.

Table 259.—Production of Quartz (Silica) in Canada, 1926-1935

Year	Quantity	Value	Year	Quantity	Value
	Tons	\$		Tons	\$
1926.....	232,082	553,161	1931.....	195,724	303,158
1927.....	233,984	496,364	1932.....	189,132	276,147
1928.....	282,522	523,933	1933.....	185,763	297,820
1929.....	265,949	561,527	1934.....	272,563	482,265
1930.....	226,200	418,127	1935.....	233,002	424,882

Table 260.—Consumption of Quartz, Silica Sand, etc., in Canada, by Industries, According to Census of Industry Reports, 1935

	Quantity	Cost at works
	Tons	\$
SILICA SAND AND SILICA (including ground quartz)—		
Soaps and cleaning preparations.....	4,422	72,688
Acids and salts.....	10,229	53,389
Paints.....	565	24,186
Refractories.....	389	2,667
Roofing paper.....	1,351	5,471
Abrasives.....	32,626	165,764
Polishes.....	3	246
Glass.....	61,858	307,677
Enamelling.....	25	1,000
Products from imported clays.....	49	400
Foundry facings and supplies.....	15	203
Non-ferrous smelters.....	53	137
Steel foundries.....	20,339	105,592
Total accounted for.....	131,924	739,420
QUARTZ AND QUARTZITE—		
Acids and salts.....	3,361	9,806
Ferro-alloys.....	8,829	26,284
Non-ferrous smelters.....	106,503	87,364
Total accounted for.....	118,693	123,454
FLINT—		
Products from imported clays.....	1,448	20,212

NOTE.—Consumption values are costs at works.

THE GYPSUM INDUSTRY

(1) Primary Production—The Gypsum Mining and Quarrying Industry

The tonnage of crude gypsum shipped in 1935 and including the mineral calcined at quarry plants totalled 541,864 tons valued at \$932,203, as compared with an output of 461,237 tons worth \$863,776 in 1934. Increases in the value of production were realized in Nova Scotia, New Brunswick, Ontario, Manitoba and British Columbia, the five gypsum-producing provinces of the Dominion. The advance attained in the industry during 1935 continued into 1936 as was evidenced by a production of 265,309 tons valued at \$462,857 during the first six months of the current year against 174,970 tons at \$343,120 during the corresponding period of the preceding year.

During 1935 there were six firms with thirteen plants employed in the mining or quarrying of Canadian gypsum. Some of the gypsum mining companies in Canada confine their operations to the production and shipment of crude gypsum or anhydrite, while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or consumption in their own gypsum products plants.

The industry during 1935 provided employment for 467 persons and distributed \$367,007 in salaries and wages, of which 219 employees and \$163,907 were credited to the gypsum mining industry in the province of Nova Scotia.

Exports of crude gypsum in 1935 totalled 439,341 tons valued at \$508,338 as compared with 354,978 tons at \$413,961 in 1934; of the 1935 exports 374,317 tons valued at \$441,574 went to the United States while 65,024 tons at \$66,764 were consigned to the United Kingdom.

Gypsum deposits have been known in Nova Scotia since the time of the earliest settlers and shipments of the crude rock were made from the Windsor district to the United States a number of years before the Revolutionary War. After the war of 1812 these shipments assumed larger proportions and have been increasing almost ever since. The first recorded production in Ontario was in 1822 when a small amount was mined and crushed for fertilizer. During the first half of the nineteenth century the industry in Canada had a varied career, Nova Scotia and Ontario being the principal producers. Of the first discovery of gypsum in New Brunswick very little is known, evidence of very early work having been carried on in the district adjacent to the town of Hillsborough. The deposits in Manitoba were first operated in 1901 and have produced extensively ever since. The first production of gypsum in British Columbia was made in 1911 but it was not until 1926 that the industry was put on a sound basis in this province. Extensive deposits of gypsum are known in Northern Ontario and these deposits form a potential reserve which in years to come may be called upon to supply material to the northern parts of Ontario and Quebec. The deposits in Northern Alberta, although situated at a distance from markets are of good grade.

The Department of Public Works and Mines, Nova Scotia, reports on the gypsum mining industry in that province for 1935 as follows: "At Cheticamp, Inverness County, Atlantic Gypsum Products Ltd. is carrying on extensive gypsum operations. No. 1 quarry was enlarged by connecting two open-faces into one long face of gypsum. The mineral is removed in 10 ton cars equipped with tractor treads and hauled by caterpillar tractors to a chute for discharge into railway cars in the valley below; drilling in this quarry has encountered a 30 foot belt of anhydrite below the floor followed by over 40 feet of good gypsum. The same company conducted gypsum mining operations at Dingwall, Victoria County, where No. 1 grade is worked by hand selection and the balance or No. 2 grade is handled by $\frac{1}{2}$ cubic yard power-shovel; Atlantic Gypsum Products also operated at Walton on the shore of Minas Basin; here the rock removed from the new quarry is a good grade of soft white gypsum, shipments of which are made for calcining in New York; the anhydrite from Walton is shipped to Norfolk, Va., for use as a fertilizer and moisture retainer around peanut plants. The largest gypsum operation in the province is conducted by the Canadian Gypsum Co. Ltd. at Wentworth, Hants County. The quarries here are overlain with about eight feet of overburden which is stripped by draglines; the face, which is approximately sixty feet high is drilled in successive rows of eight foot holes from the bottom up; the displaced gypsum is loaded by power shovel into ten ton railway cars. The new Retreat quarry at Walton was opened by driving a 700 foot tunnel through anhydrite; a raise was then driven to the surface. The Connecticut Adamant Gypsum Co. Ltd. operates

a quarry at Cheverie, Hants County; a face 18 feet high has been opened for about 500 feet and a light overburden is stripped by gasoline shovel; production was steady during the year, the gypsum being shipped to New Haven, Conn. The Victoria Gypsum Co. commenced operations during the summer at Little Narrows, Victoria County. Work consisted in the erection of a crushing plant at the base of the quarry, installation of live storage and completion of a conveyor belt system; a diesel electric power plant of 500 H.P. is to be erected to supply power for the entire operation; two diesel shovels will be used in the quarry. The following companies did not operate in Nova Scotia during the past fiscal year: the North American Gypsum Company at Baddeck, Victoria County; The Nova Scotia Coal and Gypsum Co. at Mabou, Inverness County, and The Windsor Gypsum Co. at Newport Station, Hants County." At Windsor a variety of gypsum products were produced by the Windsor Plaster Co. Ltd.

The only gypsum mining operations in New Brunswick during 1935 were those conducted at Hillsborough by the Canadian Gypsum Co. Ltd.; the mill of the company was in continuous operation throughout the year, while the quarry was in steady production from April until the end of December.

In Ontario mining and milling operations were steadily maintained by both Gypsum, Lime and Alabastine, Canada, Ltd., and the Canadian Gypsum Co. Ltd. The first-named company obtains its crude gypsum at Caledonia and manufactures an extensive range of gypsum products. The Canadian Gypsum Co. Ltd. conducts mining operations at Hagersville and in addition to shipping crude gypsum is also a producer of various building materials.

The mining and calcining of gypsum was conducted throughout the year in Manitoba by Gypsum, Lime and Alabastine, Canada, Ltd. and Western Gypsum Products Ltd.; the former company obtains its supply of crude mineral from deposits located at Gypsumville, while Western Gypsum Products conduct quarrying operations at Amaranth. Both of these companies utilize calcined gypsum in the production of building materials. In British Columbia the only company engaged in the mining of gypsum was Gypsum, Lime and Alabastine, Canada, Ltd. This company's deposits are located at Falkland where continuous operations were maintained during 1935. Crude gypsum quarried at Falkland is shipped for processing to the company's plant situated at Port Mann.

Recent results in the reduction of sulphur dioxide by coke in the Pilot Plant of Imperial Chemical Industries at Billingham, England, are of interest here; an article appearing in Canadian Chemistry and Metallurgy states—"The process has other possibilities beside the production of sulphur from metallurgical gases. In the first place, sulphur from anhydrite becomes a practical possibility, as the 1. G. and 1. C. 1. have both produced sulphur dioxide from anhydrite by heating with clay and carbon—" A new type of heat insulating building material was reported in the United States during 1935; this material consists of ordinary $\frac{3}{8}$ inch gypsum board, one surface of which is covered with a thin sheet of aluminium.

Table 261.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1934 and 1935

	1934			1935		
	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$	\$	\$	\$
Capital employed as represented by—						
(a) Present cash value of the land (excluding minerals).....	2,074,143	3,758,031	5,832,174	1,060,619	173,959	1,234,577
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....				1,008,349	1,690,219	2,698,568
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	43,950	97,900	141,850	247,528	89,038	336,566
(d) Inventory value of finished products on hand.....	204,601	53,051	257,652		64,939	64,939
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	613,009	507,877	1,120,886	813,049	589,415	1,402,464
Total.....	2,935,703	4,416,859	7,352,562	3,129,545	2,607,569	5,737,114

Table 262.—Employees, Salaries and Wages in the Gypsum Industry in Canada, 1934 and 1935

	1934				1935			
	Number			Salaries and wages	Number			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	35	4	39	59,534	49	5	54	93,350
Wage-earners—								
Mine.....	243		243		224		224	
Mill.....	146		146		189		189	
Total.....	389		389	265,197	413		413	273,657
Grand total.....	424	4	428	324,731	462	5	467	367,007

Table 263.—Number of Wage-Earners on Pay Roll in the Gypsum Industry on the 15th of each Month or Nearest Representative Date, 1934 and 1935

Month	1934		1935	
	Mine	Mill	Mine	Mill
January.....	110	92	51	125
February.....	78	124	37	145
March.....	110	154	56	159
April.....	116	134	140	223
May.....	270	153	267	205
June.....	318	180	262	201
July.....	353	150	324	237
August.....	358	181	343	218
September.....	388	184	369	201
October.....	326	147	352	199
November.....	245	149	275	191
December.....	213	112	185	155

Table 264.—Annual Production of Gypsum in Canada, by Provinces, 1926-1935

(For the years 1874 to 1925, see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Ontario		Manitoba		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1926..	678,107	1,187,918	59,546	468,411	89,987	496,059	35,172	461,461	20,916	156,964	883,728	2,770,812
1927..	829,438	1,512,015	85,293	524,550	83,998	500,688	39,895	512,008	24,493	201,754	1,063,117	3,251,015
1928..	1,013,257	1,850,243	75,033	501,252	85,811	553,271	51,285	609,039	20,982	229,843	1,246,368	3,743,648
1929..	948,895	1,152,160	70,482	485,982	100,347	832,689	67,269	631,051	24,696	243,814	1,211,689	3,345,696
1930..	827,063	982,287	82,674	513,677	94,946	776,069	34,157	298,297	32,128	248,458	1,070,968	2,818,788
1931..	707,817	878,487	58,957	451,264	53,358	374,469	23,076	231,124	20,544	176,173	863,752	2,111,517
1932..	341,508	398,861	38,019	297,520	35,655	186,175	12,719	113,739	10,728	84,084	438,629	1,080,379
1933..	315,948	363,528	30,391	88,500	24,460	112,319	6,830	65,471	5,107	46,004	382,736	675,822
1934..	378,287	488,044	30,398	104,709	33,234	141,389	9,657	81,553	9,661	48,081	461,237	863,776
1935..	454,703	523,216	30,796	105,960	38,247	164,807	10,500	85,885	7,618	52,335	541,894	932,293

Table 265.—Production in Canada, Imports and Exports of Gypsum, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
SHIPMENTS BY GRADES—				
Crude (1)—Lump or mine run.....	33,165	41,475	38,403	54,122
Crushed.....	369,696	473,558	437,699	488,186
Fine ground.....	652	3,494	369	2,893
Calcined gypsum (2).....	57,724	345,249	65,393	387,002
Total.....	461,237	863,776	541,864	932,203
Total gypsum mined and quarried.....	493,295		562,471	
Total gypsum calcined (2).....	74,356		82,569	
IMPORTS—				
Gypsum, crude (sulphate of lime).....	18	320	17	196
Gypsum ground, not calcined.....	173	4,938	262	7,846
Plaster of Paris or gypsum, calcined and prepared wall plaster.....	551	15,890	1,727	27,676
Total.....	742	21,148	2,006	35,718
EXPORTS—				
Gypsum or plaster, crude.....	354,978	413,961	439,341	508,338
Plaster of Paris, ground, and prepared wall plaster.....	712	16,078	717	38,074
Total.....	355,690	430,039	440,058	546,412

(1) Includes some anhydrite quarried in Nova Scotia.

(2) Does not include gypsum calcined in manufacturers' plants at Montreal and Calgary.

Table 266.—Consumption of Gypsum in Canadian Cement Industry, 1931-1935

Year	Tons
1931.....	56,677
1932.....	27,537
1933.....	13,319
1934.....	19,172
1935.....	21,611

(II) Secondary Production—The Gypsum Products Industry

Only 4 companies manufactured gypsum products in 1935 but 9 separate factories were in operation. Production was valued at \$1,418,793 in 1935 compared with \$1,477,646 in 1934 and included wallboard, tile, hardwall plaster, roofing slabs, etc. Detailed statistics of production are not published because of the small number of companies in this line of business.

The average number of employees in 1935 was 173, to whom \$136,297 were paid in salaries and wages. Capital employed was reported at \$2,685,222. Fuel and power cost \$60,968.

Table 267.—Principal Statistics of the Gypsum Products Industry*, 1934 and 1935

	1934	1935
Number of establishments.....	9	9
Capital employed.....	\$ 2,549,037	2,685,222
Number of employees.....	173	173
Salaries and wages.....	\$ 144,923	136,297
Cost of fuel and electricity.....	\$ 60,826	60,968
Cost of materials at works.....	\$ 668,222	581,945
Selling value of products at works.....	\$ 1,477,646	1,418,793

* Does not include data relating to one company operating in Eastern Canada.

Table 268.—Materials Used in the Gypsum Products Industry, 1934 and 1935

Materials	Unit of measure	1934		1935	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
GYPSUM PRODUCTS GROUP—					
Crude gypsum.....	ton	17,481	80,328	10,000	38,958
Calcined gypsum.....	ton	23,120	156,678	36,533	216,917
Clay.....	ton	78	1,487	53	838
Glue.....	xx		238		469
Hair.....	lb.	48,381	2,886	93,000	5,326
Paper.....	ton	3,071	156,575	3,115	152,698
Retarder.....	lb.	93,648	3,106	155,000	4,611
Sawdust or shavings.....	lb.	419,648	2,024	445,000	1,466
Starch or paste.....	lb.	168,000	10,994	200,500	13,894
Other materials.....	xx		18,127		99,137
Containers, etc.....	xx		30,123		47,631
Total.....	xx		462,566		581,945

Table 269.—World Production of Gypsum, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	985,055	961,581	981,913	Roumania (b).....	56,192	46,430	(a)
Canada.....	330,974	440,442	502,206	Spain (c).....	1,070,509	1,042,135	(a)
Union of South Africa.....	11,622	22,929	21,249	Sweden.....	48	119	167
Cyprus (estimated).....	14,000	14,000	16,000	Algeria.....	82,083	80,026	54,476
Palestine.....	2,561	3,377	4,471	United States.....	1,192,136	1,371,580	1,729,900
India.....	33,142	46,757	45,318	Tunis (estimated).....	25,000	25,000	25,000
Australia.....	60,572	89,654	118,136	Argentina.....	34,255	43,445	48,987
Total.....	1,438,000	1,579,000	1,689,000	Chile.....	14,964	10,729	(a)
FOREIGN COUNTRIES				China.....	63,009	66,650	(a)
Austria.....	44,000	33,000	38,000	Egypt (estimated).....	130,000	130,000	130,000
Estonia.....	5,580	4,828	6,139	New Caledonia.....	11,380	13,400	(a)
France.....	1,626,253	1,404,413	(a)	Brazil (estimated).....	2,000	2,000	2,000
Germany.....	555,000	851,000	952,000	Japan.....	(a)	(a)	5,544
Greece (b).....	7,070	9,050	9,754	Mexico.....	(a)	(a)	59,944
Italy (including alabaster).....	525,395	451,729	463,706	Peru.....	6,889	8,018	8,913
Yugoslavia.....	927	(a)	(a)	Total *.....	5,570,000	5,740,000	(a)
Latvia (exports).....	48,209	80,524	97,372	* Grand total.....	7,010,900	7,320,000	(a)
Luxemburg.....	12,643	10,520	29,008				

(a) Data not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(c) Including 364,768 cubic metres of gypsum converted as per (b) for 1934.

* Gypsum is also produced in Poland, Switzerland, Cuba, U.S.S.R. (Russia) and French Morocco.

IRON OXIDES (OCHRE) MINING INDUSTRY

According to finally revised statistics, the production in Canada of ochreous iron oxide, crude and refined, during 1935, totalled 5,516 short tons valued at \$77,075, as compared with 4,959 short tons worth \$66,166 in 1934. The province of Quebec produced 97.1 per cent of the 1935 tonnage, the balance coming from British Columbia. During the first six months of 1936 the Canadian production totalled 1,548 tons valued at \$21,395 as compared with 2,072 tons at \$31,443 for the corresponding period of the preceding year.

Employment in the industry during 1935 remained at the same level as in 1934, however, salaries and wages distributed showed a slight increase to \$26,748 from the 1934 total of \$24,980.

The mineral during 1935 was produced in Quebec at Almaville, Laviolette County; at La Pointe du Lac and Red Mill, Champlain County. Shipments of both crude and refined material were made; processing of refined ochres in Quebec included dehydration, calcining, milling and air flotation.

In British Columbia shipments of iron oxide or ochre were made during 1935 from deposits located in the Windermere district and from near Mons.

Canadian output of natural ochres is utilized chiefly for the purification of heating and illuminating gas and in the manufacture of paints.

The Department of Mines, Ottawa, reports that should the demand for ochres increase, there are other prospective deposits which could be drawn upon; two of these are located in Saguenay County, Quebec, in the townships of Therville and Bergeronnes, respectively; a deposit in Lynch township, Quebec, has been a producer in the past. There are numerous occurrences of ochres and iron oxides in Quebec and Ontario, and some of these might be utilized, should the market demand warrant their development. In Nova Scotia there are various beds of ochres and umbers which have been worked to some extent in the past, while deposits of ochres are also known to occur in Manitoba, Saskatchewan, Alberta and British Columbia.

Imports of ochres, ochre earths, siennas and umbers into Canada during 1935 totalled 3,109,203 pounds valued at \$54,661 as compared with 2,056,724 pounds worth \$39,380 in 1934. Of the 1935 imports 369,828 pounds came from the United Kingdom; 1,589,749 pounds from the United States; 930,587 pounds from France and 183,022 pounds from Italy. Exports from Canada of mineral pigments, iron oxides, ochres, etc. totalled 3,849,500 pounds valued at \$108,032 in 1935.

"Metal and Mineral Markets"—New York—quotations for ochre, December, 1935 were: per ton, f.o.b. Georgia mines, \$19 in sacks, \$22.50 in barrels. Buff clay, 98 per cent through 325 mesh, \$19 f.o.b. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, \$19.50.

Table 270.—Capital Employed in the Iron Oxides Industry in Canada, 1934 and 1935

	1934	1935
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:		
(a) Present cash value of the land (excluding minerals).....	128,698	35,327
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		91,204
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....		22,343
(d) Inventory value of finished products on hand.....	20,942	23,561
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	21,000	3,500
Total.....	172,730	175,935

Table 271.—Employees, Salaries and Wages in the Iron Oxides Industry in Canada, 1934 and 1935

Class	1934		1935	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
Salaried employees.....	2	\$ 3,432	2	\$ 3,472
Wage-earners.....	30	21,548	30	23,276
Total.....	32	24,980	32	26,748

Table 272.—Wage-Earners Employed, by Months, 1935

Month	Number	Month	Number
January.....	38	July.....	29
February.....	21	August.....	34
March.....	22	September.....	42
April.....	21	October.....	36
May.....	28	November.....	26
June.....	31	December.....	28

Table 273.—Production of Iron Oxides in Canada, 1926-1935

(For the years 1883 to 1925, see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	Tons	\$		Tons	\$
1926.....	6,626	101,843	1931.....	5,520	49,205
1927.....	6,125	103,536	1932.....	5,240	46,161
1928.....	5,414	111,198	1933.....	4,357	53,450
1929.....	6,518	115,952	1934.....	4,959	66,166
1930.....	6,596	83,873	1935.....	5,516	77,075

Table 274.—Production in Canada, Imports and Exports of Iron Oxides, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION (SALES) (*)—				
Quebec.....	4,798	64,566	5,357	75,388
British Columbia.....	161	1,600	159	1,687
Total.....	4,959	66,166	5,516	77,075
IMPORTS—				
Ochres, ochrey earths, siennas and umbers.....	1,028	39,380	1,554	54,661
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	3,130	653,827	3,478	623,698
EXPORTS—				
Mineral pigments, iron oxides, ochres, etc.....	1,618	96,131	1,925	108,032

(*) Includes both crude and refined.

Table 275.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1935

Year	Coke and gas		Paints pigments and varnishes		Paints pigments and varnishes	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons (b)	\$	Tons*	\$
1932.....	3,786	35,284	701	52,323	512	48,037
1933.....	2,734	29,076	504	43,826	491	43,671
1934.....	3,757	47,010	580	53,539	544	53,236
1935.....	3,701	46,204	990	77,758	564	56,219

(a) Oxide or purifying materials.

(b) Iron oxide pigments.

* Ochres, siennas and umbers.

THE MICA MINING INDUSTRY

In Canada 1,255,616 pounds of mica valued at \$82,038 was produced during 1935 as compared with 1,995,269 pounds at \$97,071 in 1934. The output of the mineral in 1935 came entirely from properties operated in the provinces of Quebec and Ontario. Of the total quantity produced in 1935, scrap, including ground mica, totalled 1,068,618 pounds or 85 per cent; the value of knife trimmed amounted to \$52,959 or 65 per cent of the total value of all grades shipped; the value of splittings totalled \$15,506, ranking second in point of value.

The falling off in production during 1935 was reflected in a relatively slight decrease in employment throughout the industry as compared with the preceding year; employees in 1935 totalled 92 as compared with 102 in 1934, while salaries and wages declined from a total of \$50,391 in 1934 to \$45,217 in 1935. The number of employees engaged in actual mining during 1935 averaged 55, while 34 were employed in dressing works.

Exports of rough cobbled and thumb-trimmed mica in 1935 totalled 149,600 pounds valued at \$52,196; those of mica scrap and waste amounted to 1,340,000 pounds worth \$6,189 while exports of mica splittings totalled 34,600 pounds valued at \$16,615. The total value of all mica exports amounted to \$75,950 as against \$117,802 in the preceding year.

"The Canadian mica production is confined almost exclusively to the phlogopite variety termed in the trade "amber mica". The productive mica region lies for the most part within a radius of about one hundred miles from the city of Ottawa, the northern portion of the field lying principally between or adjacent to the Gatineau and Lièvre rivers, in Quebec, and the southern portion in the Perth-Kingston district in Ontario. An examination was made during 1935 of an unusual occurrence of fine, flake mica of muscovite or sericite type at Baker Inlet, on the British Columbia coast, about 40 miles south of Prince Rupert. The deposit is in the form of a flat-lying bed from 3 to 7 feet thick as exposed in the mountain side, and consists essentially of a soft mass of friable mica that can be readily rubbed to a fine powder between the fingers. In view of the ease with which the material can be pulverized, and of the exceptional shipping facilities, the deposit merits consideration as a source of flake mica for the roofing, rubber, and paint trades. The high lustre of the mica might also render it acceptable to the wallpaper trade.

"The improved demand for Canadian mica, due, it is believed, in part, to curtailment of supplies from Madagascar and also to a largely increased demand for heat-resistant amber mica, led to the re-opening of a few smaller mines, and there was also a small production from newly-opened deposits in Templeton and Joliette townships, Quebec." (Report No. 773, Department of Mines, Ottawa.)

**Table 276.—Capital Employed in the Mica Mining Industry in Canada, by Provinces
1934 and 1935**

	1934			1935		
	Quebec	Ontario	Canada	Quebec	Ontario	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:						
(a) Present cash value of the land (excluding minerals).....	47,232	28,037	75,269	3,500	22,761	26,261
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....				22,871	5,349	28,220
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	17,877	2,877	20,754	43,543	1,930	45,473
(d) Inventory value of finished products on hand.....	254	2,785	3,039	300	1,477	1,777
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	38,662	1,992	40,654	38,753	5,073	43,826
Total.....	104,025	35,691	139,716	108,967	36,590	145,557

**Table 277.—Employees, Salaries and Wages in the Mica Mining Industry in Canada,
1934 and 1935**

	1934		1935	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
		\$		\$
Salaried employees.....	4	2,475	2	2,513
Wage-earners.....	98	47,916	89	42,704
Total.....	102	50,391	92	45,217

Table 278.—Production of Mica in Canada, by Provinces, 1926-1935

(For the years 1886 to 1925, see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1926	1,654	170,118	821	59,086	2,545	329,394
1927	1,454	99,194	1,284	75,185	3,738	174,377
1928	1,101	54,224	2,539	32,944	3,660	87,168
1929	1,062	72,630	2,991	45,919	4,053	118,549
1930	430	61,729	740	34,275	1,170	96,004
1931	290	30,601	1,049	25,465	1,339	54,066
1932	41	4,076	268	2,752	309	6,828
1933*	256	39,060	666	9,371	941	49,754
1934*	322	55,967	618	9,059	938	97,071
1935	373	74,894	255	7,144	628	82,038

* Total for Canada includes 20 tons valued at \$836, produced in British Columbia in 1933 and 58 tons valued at \$2,045 in 1934.

Table 279.—Production of Mica in Canada, by Grades, 1934 and 1935

	1934			1935		
	Quantity	Value, f.o.b. shipping point	Price per lb.	Quantity	Value, f.o.b. shipping point	Price per lb.
	Lb.	\$	\$	Lb.	\$	\$
Rough cobbled	7,459	514	0.27	30,865	2,448	0.08
Knife-trimmed	81,003	25,428	0.42	111,439	32,050	0.48
Thumb-trimmed	90,779	27,390	0.30	12,915	3,496	0.30
Flattings	75,000	35,120	0.44	32,321	15,506	0.47
Scrap	1,799,000	29,449	0.006	1,068,618	7,509	0.007
Total	1,995,269	97,071		1,255,816	82,938	

Table 280.—Imports and Exports of Mica, 1934 and 1935

Imports and exports of mica	1934		1935	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
Imports—				
Mica and manufactures of, n.o.p.—				
From—United Kingdom		4,879		13,041
United States		40,242		46,765
British India		17,268		4,620
Germany		128		
Other countries		170		2,375
Total		62,680		66,801
Chalk, China, Cornwall or cliff stone and mica schist		21,371		20,229
Exports—				
Mica, rough cobbled and thumb-trimmed—				
To—United Kingdom	147,000	60,635	105,500	44,904
United States	45,000	8,939	42,200	6,571
Other countries			1,900	721
Mica, scrap and waste—				
To—United Kingdom			500	3
United States	1,680,400	7,736	1,339,500	6,186
Other countries				
Mica settings—				
To—United Kingdom	18,200	6,635	800	308
United States	69,400	34,967	33,800	16,307
Mica plate and manufactures of (miscellaneous)		1,890		930
Total		117,892		75,930

Table 281.—Exports of Mica from India, 1933-1935

		1933	1934	1935
In blocks.....	Cwt.	15,702	20,617	23,774
	Rupees	2,429,357	3,520,930	4,334,680
Splittings.....	Cwt.	40,945	72,301	118,040
	Rupees	1,662,676	2,509,595	3,799,001
Total of Mica—				
To—United Kingdom.....	Cwt.	22,505	29,606	37,519
	Rupees	2,268,698	3,106,625	3,852,105
Germany.....	Cwt.	6,161	10,043	12,813
	Rupees	320,961	565,451	618,839
France.....	Cwt.	1,067	1,763	3,642
	Rupees	79,831	147,282	370,253
To—United States.....	Cwt.	19,812	39,517	69,397
	Rupees	894,321	1,306,297	1,994,942
Other countries.....	Cwt.	7,102	12,019	18,444
	Rupees	528,222	904,870	1,198,542
Total.....	Cwt.	56,647	92,918	141,814
	Rupees	4,092,033	6,030,325	8,034,681
Value of rupee in Canadian funds.....		34.768 cents	37.66 cents	37.17 cents

Table 282.—Exports of Phlogopite and Other Micras from Madagascar, 1934 (a)

	Kg.	Franc
To—France.....	153,837	1,550,000
England.....	119,707	1,003,000
Germany.....	16,578	194,000
United States.....	89,300	613,000
Other countries.....	126	3,000
Total.....	379,548	2,363,000

(a) Corresponding data for 1935 are not yet available however, the Comité d'Études Minières for the French colonies reported a production of 0.9 metric tons of muscovite and 520 metric tons of phlogopite in Madagascar during 1935.

Table 283.—Consumption of Mica in Canada by Industries, as Reported to the Annual Census of Industry, 1934-1935

	1934		1935	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
In Electrical Apparatus Industry.....	47	60,427	37	58,016
In Rubber Industry.....	68	6,792	82	6,297
In Roofing Industry.....	71	2,086	60	1,844
In Pulp and Paper Industry.....	58	2,223	40	1,750
In Mica Manufacturing Industry.....	8	7,040	9	7,018
In Paints Industry.....	10	350	6	2,089
In Coal Tar Distillation Industry.....			42	1,702
In Iron Foundry Industry (mica schist).....			332	2,701
Total Accounted for.....	262	78,918	588	81,417

NOTE.—Re VALUES.—Consumption figures are costs at factories.

Table 284.—World Production of Mica, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES			
Northern Rhodesia.....	1	1	2	Italy.....	2	5	(a)
Southern Rhodesia.....	4	2	4	Norway.....	5	17	11
Tanganyika Territory—				Sweden.....	67	16	31
Sheet.....	11	9	25	U.S.S.R. (Russia).....	5,687	(a)	(a)
Waste.....		22	21	Madagascar—			
Union of South Africa (b).....	391	273	573	Muscovite.....	(692 lb.)	(1,543 lb.)	(1,917 lb.)
Canada—				Phlogopite, etc.....	170	289	513
Knife trimmed.....	4	27	50	United States (sales)—			
Thumb trimmed.....	23	41	5	Sheets (uncut).....	163	261	418
Splittings.....	33	33	15	Scrap.....	7,813	6,892	16,832
Rough cobbled.....		1	14	Argentina.....	74	172	221
Scrap.....	783	788	477	Bolivia (exports).....	2	4	2
Ceylon (exports).....	(2 cwt.)	20	2	Brazil.....	28	12	(a)
India (exports)—				Korea.....	23	101	86
Sheet.....	785	1,032	1,189				
Splittings.....	2,047	3,615	5,902				
Australia.....	41	120	(a)				

(a) Information not available.

(b) Nearly all scrap.

The following amounts of lithia mica were produced:—

	1933	1934	1935
South West Africa.....		231	489 long tons
France.....	500	1,200	(a)
Germany.....	72	(a)	(a)
Portugal.....	870	294	8 long tons

THE SALT INDUSTRY

Sales or shipments of salt by Canadian producers of this mineral totalled 360,343 tons valued at \$1,880,978 in 1935 as compared with 321,753 tons worth \$1,954,953 in 1934 and 280,115 tons at \$1,939,874 in 1933. The tonnage shipped during 1935 represents an all-time high record for the Canadian salt industry; increases in quantity over 1934 were realized in sales of table, dairy and pressed blocks, common fine and common coarse grades while the content of salt in brine for utilization in the manufacture of chemicals increased from 124,132 tons in 1934 to 145,433 tons in 1935. The quantity of salt consumed for chemical purposes during 1935 constituted 40 per cent of the entire Canadian salt production, being the highest for this purpose since 51 per cent was utilized by the chemical industry in 1929.

The total value of salt production in 1935 revealed a decline of 3.8 per cent from that in 1934 or a price recession from an average of \$6.08 per ton to \$5.22 per ton. This decrease resulted from reduced prices for various grades other than those employed for chemical purposes.

Salt was produced during 1935 in the provinces of Ontario, Nova Scotia, Manitoba and Saskatchewan and of the total quantity sold, Ontario contributed 89 per cent and Nova Scotia, 10 per cent.

Imports of salt of all grades into Canada totalled 2,564,926 cwt. valued at \$526,740 in 1935 as compared with 2,775,886 cwt. worth \$586,033 in 1934. Of the 1935 imports, 1,018,834 cwt. was salt for use of the sea or gulf fisheries and came principally from Italy, Spain, the British West Indies and the United States.

Exports of Canadian salt during 1935 amounted to 180,899 cwt. valued at \$51,239 as compared with 131,937 cwt. worth \$48,097 in 1934. Of the 1935 exports, 137,621 cwt. were consigned to the United States and 23,849 cwt. to Newfoundland. The quantity of salt exported from Canada during 1935 was the highest since a tonnage of 9,359 in 1929.

Employees in the Canadian salt industry totalled 473 in 1935 as against 469 in 1934 and salaries and wages amounted to \$597,785 as compared with \$551,998 in the preceding year.

Salt production represents one of the oldest non-metallic industries in the Dominion, originating during the early years of the nineteenth century when the Hudson's Bay Company obtained its local supplies from brine springs occurring in the Mackenzie river basin. The real commencement of the industry on a recognized commercial basis occurred with the discovery of

salt in Ontario during 1866. The development in 1918 of the deposits at Malagash in Nova Scotia represented the first mining of rock salt in Canada. The output of this mine now contributes largely towards the salt consumption of the Maritimes. In the Prairie provinces salt has been produced since 1933 in both Saskatchewan and Manitoba. No commercial production of the mineral has been reported from Alberta since 1927.

The Malagash mine, located in Cumberland county, Nova Scotia, was operated steadily throughout 1935 and work was confined to the Lucas seam. The 20th level, 1,500 feet on the slope, is 950 feet vertical below the surface. Salt on the east side of the slope was mined by the underhand rill method while the seam on the west side of the slope, which is thin, is now mined overhand by undercutting with a longwall machine. All evaporated salt is derived from brine obtained underground on No. 4 level; at that point fresh water is sprayed on the surface of the salt until the underground reservoir is filled. The supply of fresh water is then cut off and the brine circulated until it reaches 100 per cent saturation. The brine is then pumped to the evaporator on the surface. The white salt which is mined is sold in all sizes to meet the trade requirements, from large lumps down to very fine mesh.

At Amherstburg in southwestern Ontario, Brunner, Mond Canada, Ltd., obtain a saturated brine solution by forcing water to salt strata; this brine was utilized for making soda ash and calcium chloride while at Sandwich, Ontario, Canadiana Industries Limited manufactured caustic soda, liquid chlorine and other chemical products; natural brine from local wells was employed. This company also produce table, dairy and other grades of salt by the vacuum and open pan methods.

The new chemical plant of Canadian Industries Limited, located at Cornwall, Ontario, for the manufacture of liquid chlorine and caustic soda, was brought into operation in March, 1935, and ran at a high rate of capacity and efficiency for the balance of the year. The plant of the Dominion Salt Co., Ltd., at Sarnia, Ontario, was in continuous operation throughout the year; this company employed vacuum pans and grainers in the production of different grades of table and other salt. At Goderich, Ontario, the Goderich Salt Co., Ltd., used both vacuum and open pans in the manufacture of dairy, table and other salt products. Production was maintained on a steady basis throughout the year. In the same town is located the salt plant of Western Canada Flour Mills Ltd.; this company produce several grades of table and other salt and reported steady operations throughout 1935. The Walker Salt Corp., Ltd., Port Franks, Ontario, employ open pans and was active during the entire year in the manufacture of various grades of salt, while in the township of Warwick, Lambton county, the Warwick Salt Co., Ltd., was in steady operation during 1935; open pans are used in this plant.

In Manitoba the Neepawa Salt Ltd., located at Neepawa, reported its plant in steady operation during the year. The grainer system is employed by this company while at Simpson, Saskatchewan, the open pan system was utilized throughout 1935 by the Simpson Oil Co., Ltd., for salt production.

Foreign Notes

"Practically seven months of the year have hitherto been lost in Ceylon in the manufacture of salt owing to the heavy rains. Actual operations begin in May and continue for five months only. During this period 700,000 cwt. of salt must be manufactured to meet the consumption of the island. Experiments have now been successfully conducted at Palavi and Elephant Pass to enable salt to be manufactured in wet weather. The new method is, briefly, the building of large concrete tanks into which saturated brine will be pumped during the dry weather. The substantial deposits of salt formed in these tanks are not liable to be washed away by rains The bromine factory in Baku, Russia, which was shut down for some time was started up again and full operations were anticipated before the end of April, 1936." (Chemical Trade Journal and Chemical Engineer—London).

"Recent expansion in the sodium compounds group was outstanding, and included plants located in Europe, Asia and North and South America. New plants for the manufacture of soda crystals and soda ash were erected in England, Italy, Irish Free State, Sweden and Manchuria; of sodium acetate in China; sodium phosphate and trisodium phosphate in Poland, France, Japan and Canada; and caustic soda in China, Japan, Canada and Brazil. Although production of caustic soda and other sodium compounds was begun on an experimental scale in a Venezuelan plant, it was uncertain whether the company would be able to turn out marketable products.

"The erection of a caustic soda and soda ash factory in Mukden and a caustic soda plant in Darien were under discussion. It was reported that construction of the Government plant in Turkey for the manufacture of caustic soda, chlorine and sulphuric acid would be started in 1936 and its completion in 1937 was contemplated. Foreign interests proposed the establishment of another plant at Sao Paulo, Brazil, to make caustic soda, soda ash and sodium bicarbonate on a large scale. . . . In 1935 a permit was obtained from the South Australian government by Imperial Chemical Industries to build a soda plant at Port Adelaide and in the same year Imperial Chemical Industries obtained a five-year option to take up a 50-year monopoly on certain chemical resources and thus establish an alkali industry in the Punjab." (Chemical and Metallurgical Engineering—New York).

Salt in Road Construction

A development which shows promise of being of considerable importance to the salt industry is the new market that has opened up in the construction of "stabilized" roads. These roads which are essentially of the low-cost, secondary highway type, consist of a clay bond in admixture with coarse mineral aggregates so proportioned and graded as to give maximum density under the compressive effect of traffic. The properties of the clay are improved by the admixture with it of certain chemicals, notably calcium chloride and salt.

Calcium chloride has been in use for many years as a dust-layer. Its use in integrally mixed, stabilized roads is a comparatively new development. The use of salt in road surfaces has developed in the past couple of years as a result of experiments carried on in the province of Nova Scotia by the Malagash Salt Company.

Following these experiments laboratory work was done at McGill University and in the laboratories of the National Research Council. Subsequently the development was prosecuted actively in the United States and salt stabilized roads may now be considered to be on a sound basis. Considerable mileages have been laid in a number of States as well as in the provinces of Ontario and Quebec.

Investigators claim for the salt two major effects. It retards the evaporation of moisture when the road is first laid and thus prolongs the plastic period allowing greater compression under traffic. Secondly, the growth of salt crystals as the road eventually dries out tends to diminish shrinkage and cracking of the clay bond. This latter is an important feature as the elimination of shrinkage tends to prevent ravelling of the aggregates under power traffic. (A. F. Gill—National Research Council, Ottawa).

Table 285.—Capital Employed in the Salt Industry in Canada, 1934 and 1935

	1934	1935
	\$	\$
Capital employed as represented by—		
(a) Present cash value of the land (excluding minerals).....	2,917,000	751,480
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		2,256,701
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	149,289	177,546
(d) Inventory value of finished products on hand.....	183,079	141,155
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	462,230	449,451
Total.....	3,711,598	3,776,333

Table 286.—Employees, Salaries and Wages in the Salt Industry in Canada, 1934 and 1935

	1934			1935		
	Number of employees		Total	Number of employees		Total
	Male	Female		Male	Female	
			\$			\$
Salaried employees.....	53	18	71	71	30	101
Wage-earners.....	360	38	398	372	.....	372
Total.....	413	56	469	443	30	473
			\$51,998			\$597,785

Table 287.—Number of Wage-Earners on Pay Roll in the Salt Industry on the 15th of each month, 1934 and 1935

Month	1934		1935
	Male	Female	Male and female
January.....	325	329	336
February.....	322	385	311
March.....	327	35	356
April.....	340	39	324
May.....	371	37	400
June.....	361	37	396
July.....	352	37	385
August.....	375	37	385
September.....	408	39	391
October.....	375	39	357
November.....	385	38	392
December.....	379	38	383

Table 288.—Production of Salt in Canada, by Grades, 1934 and 1935

	Manu- factured	Sold	Value of salt sold
1934	tons	tons	\$
Table, dairy and pressed blocks.....	71,249	69,779	1,098,817
Common, fine.....	66,194	67,777	384,873
Common, coarse.....	20,224	20,485	185,926
Land salt.....	403	402	1,320
Other grades.....	41,835	39,175	159,885
Brine for chemical works (salt equivalent sold or used).....	124,132	124,132	124,132
Total.....	324,037	321,753	1,954,953
Value of containers.....			603,369
Grand total.....	324,037	321,753	2,558,322
1935			
Table, dairy and pressed blocks.....	72,210	73,704	990,222
Common, fine.....	84,748	82,608	422,724
Common, coarse.....	23,057	22,014	181,543
Land salt.....	289	261	962
Other grades.....	32,488	36,323	140,094
Brine for chemical works (salt equivalent sold or used).....	145,433	145,433	145,433
Total.....	358,225	360,343	1,880,978
Value of containers.....			492,050
Grand total.....	358,225	360,343	2,373,028

Table 289.—Production of Salt by Provinces (*), 1926-1935

Year	Nova Scotia		Ontario		Manitoba		Saskatchewan	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
1926.....	8,165	68,781	252,345	1,388,672				
1927.....	14,391	102,590	254,181	1,510,777				
1928.....	19,604	118,342	279,841	1,377,629				
1929.....	27,819	157,662	302,445	1,420,424				
1930.....	23,058	136,226	248,637	1,558,405				
1931.....	27,718	143,761	231,329	1,760,388				
1932.....	31,897	150,708	231,138	1,789,751	508	7,092		
1933.....	34,278	161,889	244,107	1,765,087	1,499	18,388	231	4,510
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137	452	8,703
1935.....	38,701	161,659	320,003	1,698,608	1,538	18,765	101	2,046

(*) In addition, Alberta produced salt as follows:—1925 . . . 233 tons—value \$8,304; 1926 . . . 2,037 tons—value \$22,696; 1927 . . . 100 tons—value \$1,300.

Table 290.—Production in Canada, Imports, Exports and Consumption of Salt, 1933-1935

	1933		1934		1935	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
PRODUCTION.....	280,115	1,939,874	321,753	1,954,953	360,343	1,880,978
IMPORTS—						
Salt, for the use of the sea or gulf fisheries	54,439	184,278	57,272	173,023	50,942	147,611
Salt, in bulk, n.o.p.....	51,486	222,082	42,256	166,949	46,610	183,447
Salt, n.o.p., in bags, barrels, etc.....	29,558	240,657	37,471	234,120	30,628	193,520
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	137	4,220	1,795	11,941	67	2,162
Total	135,620	651,237	138,794	586,033	128,247	526,740
EXPORTS.....	5,335	43,461	6,597	48,097	9,045	51,239
APPARENT CONSUMPTION OF SALT.....	410,400	2,547,650	453,950	2,492,889	479,545	2,356,479

Table 291.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1934 and 1935

Industries	1934		1935	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	46,095,000	236,185	42,786,700	212,554
Slaughtering and meat packing.....	62,519,037	392,745	59,027,400	364,331
Acids, alkalies and salts—Brine (salt content) and dry salt.....	273,296,000	183,214	342,782,000	286,368
Soaps.....	5,613,108	30,309	5,695,451	25,588
Dyeing, cleaning and laundry work.....	4,227,701	36,315	4,177,216	31,791
Dyeing and finishing of textiles.....	1,719,970	11,257	2,327,718	10,322
Artificial ice.....	2,446,515	10,806	1,963,710	8,541
Abrasives—artificial.....	318,000	1,347	514,000	2,212
Waterworks.....	1,172,614		1,100,000	
Leather tanneries.....		14,085	8,813,300	45,946
Pulp and paper mills.....	18,874,000	79,106	19,510,000	77,932
Woollen textiles.....		10,844		6,499
Stock and poultry foods.....	1,166,240	10,434	2,384,000	18,831
Bread and other bakery products.....	12,657,120	135,114	12,406,240	130,370
Fruit and vegetable preparations.....	5,977,986	45,134	6,461,954	48,121
Biscuits, confectionery, etc.....	1,324,960	13,343	1,246,840	13,924
Foods, breakfast.....	1,285,698	9,321	1,384,929	10,176
Sausage and sausage casings.....		5,362	1,734,325	11,545
Ice cream industry*.....	513,520	2,605	1,479,036	12,133
Breweries.....	278,612	2,585	321,805	2,590
Malt and malt products.....	271,070	1,774	274,766	1,765
Coffee, tea and spices.....	145,213	1,479	161,286	1,842
Macaroni, vermicelli, etc.....	40,795	399	53,471	547
Ice cream cones.....	3,553	38	3,420	28
Foods, miscellaneous.....	484,943	6,422	614,004	8,174
Tobacco, cigars and cigarettes.....	14,740	189		

* Subject to revision.

Table 292.—World Production of Salt, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1933	1934	1935
BRITISH EMPIRE			
United Kingdom—			
Rock-salt.....	21,596	20,848	19,539
Brine-salt.....	2,342,579	2,499,025	2,680,553
Malta.....	1,200	2,200	2,000
Mauritius (estimated)	1,500	1,500	1,500
Sea-salt.....	400	400	400
Nigeria (estimated)			
Somaliland (exports)—			
Sea-salt.....	2,704	3,161	2,613
South West Africa.....	3,094	2,756	5,535
Anglo-Egyptian Sudan.....	(a)	24,035	26,115
Kenya.....	(a)	3,750	3,750
Tanganyika Territory.....	7,200	7,301	6,807
Uganda.....	(b) 1,492	4,872	3,130
Union of South Africa (d).....	86,782	81,918	(a)
Canada.....	258,401	289,319	321,735
British West Indies (exports)—			
Sea-salt—			
Bahamas.....	2,821	3,125	536
Turks and Caicos Islands.....	24,566	18,663	28,348
Ceylon.....	8,222	62,448	40,955
Cyprus (estimated).....	3,000	3,000	3,000
India (including Aden)—			
Rock-salt.....	170,184	179,171	178,352
Other salt.....	1,542,220	1,784,581	1,769,821
Palestine—			
Rock-salt.....	834	837	853
Other salt.....	8,272	9,241	10,212
Australia—			
Victoria (e).....	40,406	46,074	47,592
Western Australia.....	(a)	2,670	(a)
South Australia.....	58,587	61,083	78,003
Total*.....	4,600,000	5,100,000	5,200,000
FOREIGN COUNTRIES			
Austria—			
Rock-salt.....	1,058	850	1,237
Brine-salt.....	138,447	161,146	195,078
Bulgaria—			
Rock-salt.....	5,590	6,300	5,246
Sea-salt, etc.....	13,628	48,640	36,050
Czechoslovakia—			
Rock-salt.....	148,987	139,883	156,259
Brine-salt.....	5,105	5,090	4,901
France—			
Rock-salt and brine-salt.....	1,591,353	1,646,853	1,524,725
Sea-salt.....	505,144	391,783	343,000
Germany—			
Rock-salt.....	1,824,564	1,992,225	2,044,508
Brine-salt.....	419,564	501,272	552,718
Greece—			
Sea-salt.....	72,288	105,995	112,180
Italy—			
Rock-salt and brine-salt.....	338,657	387,094	475,801
Sea-salt.....	696,452	566,212	658,788
Netherlands (sales).....	63,923	73,578	69,842
Poland—			
Rock-salt.....	442,393	240,856	240,761
Brine-salt.....		257,529	266,000
Portugal—			
Rock-salt.....	26	28	31
Sea-salt (exports).....	54,441	55,618	80,670
Roumania—			
Rock-salt.....	273,615	303,847	318,878
Sea-salt.....	(a)	(a)	1,428
Spain—			
Rock-salt.....	154,280	157,496	(a)
Brine-salt and sea-salt.....	760,260	592,795	(a)
Switzerland.....	79,079	80,307	78,497
U.S.S.R. (Russia).....	2,687,000	3,344,000	4,293,000
Yugoslavia (brine-salt).....	43,156	41,260	42,862
Algeria—			
Rock-salt and sea-salt.....	77,632	42,208	65,649
Abyssinia (estimated).....	10,000	10,000	10,000
Angola (estimated).....	30,000	30,000	30,000
Belgian Congo.....	578	(a)	(a)
Canary Islands (estimated).....	2,000	2,000	2,000
Egypt (exports).....	134,271	283,913	252,794
Eritrea.....	91,036	(a)	(a)

Table 292.—World Production of Salt, 1933-1935—Concluded

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1933	1934	1935
French Morocco—			
Rock-salt.....	1,557	1,047	1,175
French Somaliland (exports).....	33,755	34,936	75,292
French West Africa.....	(a)	1,181	(a)
Italian Somaliland.....	212,900	(a)	(a)
Mozambique—			
Sea-salt.....	(a)	(a)	2,666
Tripoli (estimated).....	22,000	22,000	22,000
Tunis.....	85,145	85,592	78,444
Mexico.....	89,297	(f) 80,000	56,834
Panama (estimated)—			
Sea-salt.....	5,650	10,731	12,024
United States—			
Rock-salt.....	1,593,743	1,708,198	1,570,752
Brine-salt.....	3,090,202	3,051,285	3,426,440
Evaporated salt.....	2,106,209	2,037,012	2,080,395
Cuba (sea-salt).....	22,827	24,168	20,000
Argentina.....	202,321	191,372	230,738
Brazil.....	150,627	76,540	(a)
Chile.....	43,944	30,717	35,877
Colombia—			
Rock-salt.....	4,583	5,678	5,058
Brine-salt (estimated).....	32,000	35,000	35,000
Sea-salt.....	8,196	12,221	24,787
Costa Rica.....	2,900	3,277	(a)
Ecuador (sea-salt).....	12,127	12,572	13,500
Guatemala (sea-salt).....		2,867	2,040
Peru—			
Rock-salt.....	5,442		
Brine-salt.....	5,489	8,450	9,428
Sea-salt.....	2,196	3,380	3,771
Sea-salt.....	14,271	21,971	24,513
Panama (sea-salt).....	5,650	10,731	12,024
Netherlands West Indies.....	(g) 9,250	(g) 6,376	3,721
Venezuela.....	(a)	8,000	(a)
China (estimated).....	2,400,000	2,500,000	2,600,000
Formosa—			
Sea-salt.....	166,939	158,690	(a)
" (sun-dried).....	21,964	29,861	(a)
French Indo-China.....	113,000	158,000	200,000
Iraq—			
Rock-salt.....	(a)	(a)	2,356
Sea-salt.....	(a)	(a)	4,578
Japan (c).....	620,872	665,619	594,894
Korea.....	136,000	136,000	136,000
Kwantung (year ended March 31st).....	296,374	245,500	(a)
"Manchoukuo".....	720,000	720,000	720,000
Netherlands East Indies—			
Government production.....	83,265	81,144	85,040
Native production.....	13,527	9,767	(a)
Philippine Islands.....	37,339	(a)	(a)
Portuguese India (estimated).....	12,000	12,000	12,000
Syria (estimated).....	10,000	10,000	10,000
Turkey—			
Rock-salt.....			15,262
Brine-salt.....			49,931
Sea-salt.....	140,300	187,591	146,104
Total*.....	23,000,000	24,000,000	26,000,000
World's total*.....	28,000,000	29,000,000	31,000,000

* Salt is also produced in many countries for which statistics are not available, e.g., Gold Coast, Bolivia, Siam.

(a) Information not available.

(b) Excluding production of Kibero.

(c) Excluding production from salt beds, which, although on government beach lands, have no fixed areas. Figures refer to years ended March 31 following that stated.

(d) Figures refer to business years.

(e) Year ended June 30.

(f) Estimated.

(g) Exports.

TALC AND SOAPSTONE INDUSTRY

Production (shipments) of talc and soapstone, both crude and refined, in Canada during 1935 was valued at \$171,532 as compared with \$180,777 in 1934. The value of the soapstone output alone in 1935 totalled \$32,053. Production of this material is confined to the province of Quebec. Talc production in 1935 totalled 13,803 short tons valued at \$139,479, of which 13,710 tons worth \$138,161 came from properties located in Hastings County, province of Ontario, while 93 tons valued at \$1,318 were produced in British Columbia.

Employment in the industry during the year under review showed a decline corresponding with the decrease recorded in production, the number of employees totalling 94 as compared with 112 in 1934; salaries and wages also fell off from a total of \$79,711 in 1934 to \$69,803 in 1935.

Exports of talc from Canada in 1935 also registered a decrease, the total tonnage being 8,927 valued at \$90,823 as against 9,386 tons worth \$103,631 in the preceding year; of the total exports in 1935, 7,947 tons valued at \$80,504 went to the United States.

The high grade white talc produced in Canada is of the foliated type and comes from deposits occurring near Madoc, Hastings County, Ontario; the crude talc is milled locally with the different grades going to the cosmetic, paper, textile, rubber and other talc-consuming industries. Talc production in British Columbia comes from near McGillivray Falls on the P. G. E. railway and and from near Sooke on Vancouver Island. The mineral mined in this province is employed principally in the manufacture of roofing material.

The Canadian soapstone industry is centred in Thetford and Broughton townships in the province of Quebec; producers in this district operate sawing equipment for the manufacture of blocks or brick for the pulp and paper industry where it is employed chiefly as a refractory lining in alkali recovery furnaces in paper mills, using the sulphite process. Soapstone is easily carved and when polished takes a soft, marble-streaked appearance; various ornamental and building products, including monuments and mantels are now being shaped from Quebec soapstone.

The United States Bureau of Mines has investigated, on a laboratory scale, the froth flotation of talc and comment that the movement toward purification of talc by flotation may be important in connection with some of the newer ceramic uses, because some ceramists have difficulty in obtaining tales low in lime and iron and of constant and dependable composition. It is also interesting to note that according to a recent report the strength of concrete is increased by addition of 5 per cent talc.

Table 293.—Capital Employed in the Talc and Soapstone Industry in Canada, 1934 and 1935

	1934	1935
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Present cash value of the land (excluding minerals).....	557,143	5,500
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		560,929
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	7,350	4,470
(d) Inventory value of finished products on hand.....	8,410	5,997
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	67,291	62,605
Total.....	640,194	639,501

Table 294.—Employees, Salaries and Wages in the Talc and Soapstone Industry in Canada, 1934 and 1935

	1934				1935			
	Number of employees		Total	Salaries and wages	Number of employees		Total	Salaries and wages
	Male	Female			Male	Female		
Salaried employees.....	9	2	11	\$ 26,516	10	2	12	\$ 25,662
Wage-earners.....	101	.....	101	53,195	82	.....	82	44,141
Total.....	110	2	112	79,711	92	2	94	69,803

Table 295.—Production of Talc and Soapstone in Canada, 1926-1935

(For the years 1888 to 1925, see Mineral Production of Canada 1928)

Year	Value	Year	Value
	\$		\$
1926.....	217,195	1931.....	157,083
1927.....	236,105	1932.....	159,038
1928.....	219,358	1933.....	190,836
1929.....	229,198	1934.....	180,777
1930.....	186,216	1935.....	171,532

Table 296.—Production (Sales) in Canada, Imports and Exports of Talc and Soapstone, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
PRODUCTION—						
Soapstone (Quebec).....		47,680		44,297		32,053
Talc (Ontario and British Columbia).....	15,181	143,156	13,959	136,480	13,803	139,479
Total Canada.....		190,836		180,777		171,532
IMPORTS—						
Talc or soapstone, ground or unground—						
From—United Kingdom.....	226	17,396	121	5,875	(5 cwt.)	18
United States.....	1,700	23,604	2,496	29,812	2,214	29,431
Other countries.....	224	7,650	280	9,218	480	15,054
Total imports.....	2,150	48,650	2,897	44,905	2,694	44,503
EXPORTS—						
Talc—						
To—United Kingdom.....	1,520	26,506	937	12,376	930	9,660
United States.....	9,024	86,852	7,858	81,794	7,947	80,504
Other countries.....	180	3,592	94	1,653	50	659
Total exports.....	10,724	116,950	8,889	95,823	8,927	90,823

Table 297.—Consumption of Talc in Canada, by Industries, as Reported to the Annual Census of Manufactures, 1934 and 1935

	1934		1935	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Electrical Apparatus.....	97	2,299	166	4,297
Paints.....	1,676	40,926	1,811	45,654
Soaps and cleaning preparations.....	184	2,956	139	2,583
Toilet preparations.....	402	24,714	504	29,250
Medicinals and pharmaceuticals.....	85	3,732	103	6,269
Polishes.....	1	27	1	32
Products from imported clays.....	76	1,982		
Prepared roofing.....	1,546	20,448	1,363	16,034
Pulp and paper.....	1,482	23,895	1,361	24,652
Total Accounted for.....	5,549	120,979	5,448	123,771

Table 298.—World Production of Talc, 1933-1935

(Supplied by Imperial Institute)
(Long tons)

Producing Country	1933	1934	1935	Producing Country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	166			Italy.....	33,909	37,042	41,014
Union of South Africa.....	276	215	299	Norway.....	19,571	27,285	27,343
Canada (sales) (c).....	13,554	12,463	12,324	Roumania.....	1,094	1,902	1,966
India.....	17,048	9,375	12,596	Spain (b).....	5,682	10,750	(a)
Australia.....	1,769	1,739	1,442	Sweden.....	4,630	6,398	5,967
FOREIGN COUNTRIES				Morocco (French) (exports).....	518	776	709
Austria.....	25,000	30,188	30,254	United States (sales).....	148,235	123,665	154,211
Finland.....	1,150	1,561	(a)	Uruguay (exports).....	1,250	2,595	1,181
France.....	76,230	67,812	(a)	Egypt.....	2,491	2,562	360
Germany (Bavaria).....	5,026	6,824	3,900	"Manchoukuo".....	61,444	64,000	(a)
Greece.....	1,252	116	543	Argentina.....	20	42	173
				Bulgaria.....		15	15
				China.....	3,000	3,000	(a)

Talc is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) In addition the following were quarried, 3,301 and 2,590 cubic yards in 1933 and 1934, respectively.

(c) Excluding soapstone which is only recorded by value and was as follows:—

1933.....	£10,600
1934.....	£ 8,900
1935.....	£ 6,500

MISCELLANEOUS NON-METAL MINING INDUSTRIES

Included in this chapter are the following non-metallic minerals:—

Actinolite	Manganese, bog
Barytes	Mineral waters
Bituminous sands	Natro-alunite
Fluorspar	Phosphate
Graphite	Pyrites and Sulphur
Lithium minerals	Silica brick
Magnesitic dolomite	Sodium carbonate
Magnesium sulphate	Sodium sulphate

Canadian operators producing certain non-metallic minerals and who are usually relatively few in number have been segregated for statistical purposes into a single group designated as the miscellaneous non-metal mining industry. Minerals or primary mineral products produced by this industry during 1935 included: fluorspar, graphite, magnesitic dolomite (crude and refined), magnesium sulphate, mineral waters, phosphate, silica brick, sodium carbonate and sodium sulphate. For convenience, the sulphur content of pyrites shipped, sulphur recovered from smelter gas, and peat are recorded with the various miscellaneous minerals listed above.

The total value of production in this industry during 1935 amounted to \$1,674,967 as compared with \$1,678,482 in 1934. A comparison of the values for individual products with those of the previous year reveals decreases for bituminous sands, fluorspar, mineral waters, peat and sodium sulphate. Of production values showing increases, those for magnesitic dolomite, magnesium sulphate, and sulphur were particularly pronounced.

Table 299.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1934 and 1935

	1934	1935
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—		
(a) Present cash value of the land (excluding minerals).....	2,715,240	534,561
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		1,471,042
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	103,130	89,208
(d) Inventory value of finished products on hand.....	186,763	207,030
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	286,709	253,283
Total.....	3,291,842	2,555,124

Table 300.—Employees, Salaries and Wages in the Miscellaneous Non-Metal Mining Industries, 1934 and 1935

	1934				1935			
	Number of employees			Salaries and wages	Number of employees			Salaries and wages
	Male	Female	Total		Male	Female	Total	
				\$				\$
Salaried employees.....	36	9	45	79,333	41	8	49	91,736
Wage-earners.....	348		348	292,429	317		317	266,101
Total.....	384	9	393	371,762	358	8	366	357,837

Table 301.—Wage-Earners, by Months, 1933-1935

Month	1933	1934	1935
January.....	89	239	161
February.....	94	253	154
March.....	117	269	205
April.....	156	243	222
May.....	175	446	328
June.....	234	498	419
July.....	344	460	429
August.....	378	431	420
September.....	369	402	418
October.....	363	340	372
November.....	322	286	378
December.....	318	283	228
Average.....	253	348	317

Table 302.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1934 and 1935

Item	Unit of measure	1934		1935	
		Quantity	Value	Quantity	Value
			\$		\$
Actinolite.....	ton	30	365		
Barytes.....	ton				
Bituminous sands.....	ton	862	3,449	40	160
Fluorspar.....	ton	150	2,100	75	900
Graphite.....	xx		71,424		79,781
Magnesitic dolomite.....	xx		382,927		486,084
Magnesium sulphate.....	ton	42	1,100	340	7,965
Mineral waters.....	Imp. gal.	97,440	17,738	146,516	16,590
Peat.....	ton	1,878	7,343	1,340	5,761
Phosphate (a).....	ton	81	683	186	1,103
Silica brick.....	M	2,528	85,945	2,461	96,194
Sodium carbonate.....	ton	244	1,920	242	2,430
Sodium sulphate.....	ton	66,821	587,986	44,817	343,764
Sulphur (*).....	ton	51,537	515,502	67,446	634,235
Total.....	xx		1,678,482		1,674,967

(a) In 1935 and in 1934, production represents apatite mined in Quebec.

(*) Includes sulphur content of pyrites concentrates at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making.

ACTINOLITE

Commercial production of actinolite (CaMgFe) in Canada has originated entirely in the townships of Elzevir and Kaladar in Hastings and Addington counties of Ontario. No shipments of the mineral were reported during 1935; in 1934, however, 30 tons valued at \$365 were produced near Kaladar, Ontario; the output in 1934 was marketed in the ground state and contained a relatively high percentage of added mica flake. Actinolite is employed chiefly in the manufacture of roofing materials.

Table 303.—Production of Actinolite in Canada, 1926-1935

(For production from 1897 to 1925, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	80	1,000	1931.....	35	456
1927.....	86	1,075	1932.....		
1928.....	70	875	1933.....		
1929.....	30	375	1934.....	30	365
1930.....	34	437	1935.....		

BARYTES

Barite or barytes production in Canada during past years came largely from deposits in Nova Scotia, Quebec and Ontario and in recent years more particularly from deposits in the Lake Ainslie district, Nova Scotia. The last commercial shipments from Canadian deposits were made in 1933 in which year 20 tons valued at \$60 were produced and shipped at the Tionaga mine, Penhorwood township, Ontario. A modern mill was installed a few years ago at a deposit in Langmuir township, Ontario; this property, however, was closed down without coming into commercial production. The Department of Mines, Ottawa, reports that some interest was taken recently in the possibility of shipping barite from this region for export to Trinidad for oil drilling, the material being used for weighing the drilling mud. There being no lithopone or barium chemicals industry in Canada, no demand exists at the present time for crude ore.

The British Columbia Department of Mines recently reported the discovery of barite at the head of Sulphurets Creek, in the neighbourhood of Brucejock lake, Unuk River area.

During 1935 crude barite, both domestic and imported, used in the United States totalled 290,344 short tons, of which 93,692 tons were utilized in the manufacture of ground barite; 146,164 tons for lithopone and 50,488 tons for barium chemicals.

United States barite quotations f.o.b. mines, October, 1936 were: Georgia barite ore, crude, \$7 per long ton. Missouri: per ton, water ground and floated, bleached, \$23, car lots, f.o.b. works. Crude ore, minimum 95 per cent BaSO₄, less than 1 per cent iron, \$7; 1 per cent iron and 93 per cent BaSO₄, \$6.50; 90 per cent BaSO₄, \$6, f.o.b. mines.

Imports of barite during 1935 totalled 2,139 tons valued at \$33,739 as compared with 1,557 tons worth \$26,397 in 1934 and of the 1935 imports 1,166 tons valued at \$15,794 came from Germany; 344 tons at \$7,477 from the United States and 335 tons at \$5,547 from the United Kingdom.

Table 304.—Production of Barytes in Canada, 1926-1935

(For the years 1885 to 1925, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	105	2,307	1931.....	16	363
1927.....	56	1,268	1932.....		
1928.....	127	2,847	1933.....	20	60
1929.....	105	2,341	1934.....		
1930.....	66	1,484	1935.....		

Table 305.—Imports of Blanc Fixé, Lithopone and Barytes into Canada, 1932-1935

Year	Lithopone		Barytes		Blanc Fixé	
	Tons	Value \$	Pounds	Value \$	Pounds	Value \$
1932.....	8,055	585,148	2,583,400	22,989	932,168	20,932
1933.....	5,694	406,598	3,174,700	28,255	552,801	11,390
1934.....	7,265	510,558	3,113,800	26,397	968,201	21,638
1935.....	8,692	620,615	4,278,400	33,739	1,139,106	25,759

Table 306.—Barytes and Blanc Fixé Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1932-1935

Year	Barytes		Blanc Fixé	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
1932.....	2,064,303	35,138	23,353	817
1933.....	2,062,957	33,578	47,793	1,471
1934.....	2,393,330	44,690	93,918	2,481
1935.....	2,308,628	43,702	141,975	4,223

Table 307.—World Production of Barium Minerals, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1933	1934	1935
BRITISH EMPIRE			
United Kingdom—			
Barytes, unground.....	39,943	37,719	41,881
Witherite, unground.....	5,111	10,412	9,409
Barytes—			
Ground, bleached.....	7,623	5,548	6,288
Ground, unbleached.....	13,943	20,315	20,554
Southern Rhodesia.....		13	
Canada (sales).....	18		
India.....	5,651	3,813	5,493
Australia.....	2,095	2,492	2,544
FOREIGN COUNTRIES			
Austria.....	1,014	1,009	784
France.....	13,500	17,850	(a)
Germany—			
Baden.....	(a)	19,370	12,248
Bavaria.....	4,081	8,253	6,961
Prussia.....	141,199	321,164	321,786
Saxony.....	128	476	213
Thuringia.....	(a)	(a)	545
Italy.....	23,074	31,896	40,502
Spain (b).....	4,193	16,586	(a)
Algeria.....	10		
Egypt.....		49	84
United States.....	130,716	159,251	194,710
Brazil.....	877	(a)	(a)
Korea.....	4,891	5,841	10,853
China.....	3,043	9,350	(a)
Greece.....	(a)	7,729	22,726

Barytes is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) In addition 75 cubic metres were produced in quarries during 1933, and 147 cubic metres during 1934.

BITUMINOUS SANDS

Commercial production of bituminous sands in Canada is confined to the province of Alberta. Large deposits of the material occur along the Athabaska river in the northern part of the province. Output during 1935 totalled 40 tons valued at \$160 as compared with a production of 862 tons valued at \$3,449 in 1934.

The Department of Mines, Ottawa, has conducted a comprehensive investigation of these deposits of natural asphalt. In addition to field exploration during fifteen field seasons, extensive laboratory studies of the bituminous sand and of bitumen separated from it have been made. Various industrial applications for the separated bitumen, as for example, in the manufacture of paints and varnishes and in the manufacture of certain rubber goods, are also being investigated. Representatives of private capital have recently completed further studies with a view to commercial development. Products which may be derived, reports the Department of Mines, include motor fuels and other liquid hydrocarbons as well as certain solid and semi-solid bitumens.

The total value of petroleum, asphalt and their products imported into Canada during 1935 totalled \$44,092,526 as compared with \$41,326,516 in 1934. Included in the 1935 imports were 120,024 cwt. of solid asphalt valued at \$126,979; 113,104 gallons of liquid asphalt valued at \$12,265; 29,035 gallons of asphaltum oil for paving valued at \$2,338, and crude petroleum in its natural state, .7900 specific gravity or heavier at 60 degrees temperature for refining, 1,156,788,480 gallons valued at \$33,816,433.

Table 308.—Production of Bituminous Sands in Canada, 1926-1935*

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	528	2,112	1931.....	1,015	4,060
1927.....	2,706	10,824	1932.....	343	1,372
1928.....	94	374	1933.....	466	1,662
1929.....	989	3,956	1934.....	862	3,449
1930.....	2,067	8,268	1935.....	40	160

* Production came entirely from the province of Alberta.

FLUORSPAR

Canadian mine shipments of fluorspar during 1935 totalled 75 tons valued at \$900 as compared with 150 tons worth \$2,100 in 1934. Output for both years came from deposits located in the Madoc area, Hastings County, Ontario. Fluorspar has also been produced at the Rock Candy Mine, in British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited; this property, however, was not in production during 1935.

The following figures show the relative dependence of the United States fluorspar industry upon the different industries in which fluorspar is used in that country.

Table 309.—Fluorspar Shipped from Mines in the United States, by Uses, 1935
(United States Bureau of Mines)

Industry	Short tons	Average value per ton
		\$
Steel.....	100,988	13.77
Foundry.....	2,336	12.44
Glass.....	10,256	22.22
Enamel and Vitrolite.....	4,087	24.64
Hydrofluoric acid and derivatives.....	3,333	22.42
Miscellaneous.....	2,248	13.76
	123,248	15.04
Exported.....	313	14.86
	123,561	15.04

United States fluorspar prices, October, 1936, were: per net ton, 85 per cent CaF₂ and not over 5 per cent SiO₂, Kentucky and Illinois, in bulk f.o.b. mines, washed gravel, \$18 for all rail movement; \$19 for barge movement. No. 2 lump, \$20 f.o.b. mines. Ground fluorspar, f.o.b. Illinois mines, 95 to 98 per cent CaF₂ and not over 2½ per cent SiO₂, \$35 in bulk; \$37 in bags or barrels. Foreign fluorspar, gravel, 85-5, \$21.50 per gross ton, duty paid, Baltimore or Philadelphia.

Table 310.—Production of Fluorspar in Canada, by Provinces, 1926-1935
(For the years 1905 to 1925, see Mineral Production of Canada, 1928)

	Ontario		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1926-1928.....	70	1,120	17,800	267,000	17,870	268,120
1929.....	80	1,240			80	1,240
1930.....	40	620			40	620
1931.....	32	464			32	464
1932.....	73	1,064			73	1,064
1933.....	150	2,100			150	2,100
1934.....	75	900			75	900
1935.....						

Table 311.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry

Industries	1934		1935	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Steel foundries.....	4,555	55,643	5,859	73,047
Chemicals.....	2,177	29,790	2,095	34,347
Glass.....	119	4,472	98	3,357
Ferro-alloys.....	70	1,400	134	230
Enamelling and glazing.....	70	1,400	106	2,700
Total accounted for.....	6,921	91,305	8,892	113,681

Table 312.—World Production of Fluorspar, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935
BRITISH EMPIRE			
United Kingdom.....	28,058	34,216	31,146
Union of South Africa.....	463	1,371	1,949
Canada.....	65	134	67
Australia.....	985	1,737	685
Newfoundland (c).....		2,400	2,930
FOREIGN COUNTRIES			
France.....	14,800	13,900	(a)
Germany—			
Anhalt.....	(a)	7,241	7,941
Baden.....	(a)	6,424	3,879
Bavaria.....	25,948	29,193	30,783
Prussia.....	10,485	21,215	24,229
Saxony.....	3,614	6,424	6,828
Thuringia.....	(a)	(a)	23,200
Italy.....	7,592	9,515	9,400
Norway.....	499	662	1,050
Spain (b).....	3,130	5,400	(a)
United States.....	52,300	78,000	91,000
Argentina.....	197	306	397
China.....	4,700	5,000	(a)
Korea.....	8,933	11,908	9,568

Fluorspar is also produced in U.S.S.R. (Russia) and Federated Malay States.

(a) Information not available.

(b) In addition 120 cubic metres were produced from quarries during 1933 and 270 cubic metres during 1934.

(c) Exports for year ended June 30.

GRAPHITE

Canadian mine production of graphite during 1935 was valued at \$79,781 as compared with \$71,424 in 1934 and \$18,367 in 1933. Production in 1935, as for several years past, came chiefly from the Black Donald mine, Renfrew county, Ontario; relatively small shipments of Quebec graphite have also been made during recent years.

The Department of Mines, Ottawa, describes the deposit worked by the Black Donald Graphite Company as containing exceptionally high-grade graphite, unsuitable for crucibles, but well adapted for lubricants and foundry purposes; Black Donald graphite is now being satisfactorily used in pencils, the higher-grade concentrate being reduced to extremely fine powder in a new type of pulverizer, making a product comparable in fineness to the amorphous graphite hitherto preferred for pencil purposes. The Department of Mines, Ottawa, also reports that inquiries are sometimes received regarding possible markets for amorphous graphite, deposits of which exist in the Maritime Provinces and other parts of Canada, on account of its finely divided character, natural low-grade amorphous graphite usually cannot be satisfactorily freed from admixed impurities and must be employed in the natural state; such amorphous graphites, with 35 to 45 per cent carbon content, are employed chiefly for structural paints; they are available in quantity and command but a relatively low price.

Crystalline graphite is obtained chiefly from Ceylon, Germany, Madagascar and Norway; the United States Bureau of Mines states that the United States consumption of natural graphite, which probably parallels world conditions, is roughly 20 per cent in crucibles, 40 per cent for general foundry work, 15 per cent in pencils or crayons, 15 per cent in lubricants, and 10 per cent in paints, stove polishes, and miscellaneous uses. Crucible making, which requires the more costly varieties of graphite, was formerly the most important outlet, but crucible melting has been abandoned at many foundries and steel works in favour of electric furnaces or other processes; at present the consumption of natural graphite is about evenly divided between crystalline and amorphous varieties.

According to the United States Department of Commerce, the total shipments of graphite from Madagascar during the first quarter of 1936 amounted to 2,300 metric tons, of which quantity Great Britain took 1,675 tons, the United States, 312, France, 207, and Germany, 95. During the corresponding quarter of 1935 total exports amounted to 2,102 tons, while during the entire year 1935 shipments totalled 8,045 tons.

United States graphite quotations, October, 1936: per pound, f.o.b. New York, Ceylon lump, 6½ to 7½ cents; Carbon lump, 4 to 6 cents; chip, 5 to 6 cents; dust, 3 to 4 cents; Madagascar flake, 6 to 7½ cents. No. 1 flake, 9½ to 17 cents; No. 2, 5½ cents upward. Crude amorphous graphite, \$12 to \$23 per ton, according to grade.

Canadian production of graphite during the first six months of 1936 was valued at \$41,738 as compared with \$39,087 for the corresponding period of 1935.

Table 313.—Production of Graphite in Canada, by Provinces, 1926-1935

(For production from 1886 to 1925, see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1926.....	326	29,516	2,401	165,344	2,727	194,860
1927.....	34	2,043	1,795	109,613	1,829	111,656
1928.....	50	4,668	1,047	52,373	1,097	57,041
1929.....	173	12,652	1,288	90,522	1,461	103,174
1930.....	197	9,850	1,338	86,542	1,535	96,392
1931.....			548	32,149	548	32,149
1932.....			346	18,483	346	18,483
1933.....	43	2,222	362	16,145	405	18,367
1934.....	129	6,426	1,389	64,998	1,518	71,424
1935.....	21	1,281	1,761	78,500	1,782	79,781

Table 314.—Production in Canada, Imports and Exports of Graphite, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
Ore milled.....	1,234		2,038		4,000	
Production.....	405	18,367	1,518	71,424	1,782	79,781
IMPORTS—						
Crucibles, plumbago.....		26,521		36,363		38,066
Plumbago, not ground or otherwise manufactured.....		4,729		2,989		6,559
Plumbago, ground and manufactures of, n.o.p.....		69,003		103,652		92,852
EXPORTS—						
Graphite or plumbago, crude or refined..	987	40,115	1,935	90,129	3,548	145,772
Carbon and graphite electrodes.....		305,607		564,432		488,188

Table 315.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported to the Census of Industry, 1935

Industries	Quantity	Cost at works
	Tons	\$
Paints and varnishes.....	64	5,293
Polishes.....	57	6,679
Foundries.....	156	16,179
Acids and salts.....	38	11,834
Prepared foundry facings.....	121	5,740
Total accounted for.....	436	45,725

Table 316.—World Production of Graphite, 1933-1935

(Supplied by Imperial Institute)
(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Canada (sales).....	362	1,355	(a)	Germany (crude).....	19,443	17,258	21,321
Australia.....	30	5	44	Italy.....	3,149	3,846	5,072
Ceylon (exports).....	9,559	11,569	13,908	Norway.....	1,951	2,245	2,305
Union of South Africa.....	58	62	65	Japan.....	855	954	1,182
India.....		337	557	Madagascar.....	3,518	8,343	9,621
FOREIGN COUNTRIES				Mexico.....	2,643	3,827	6,865
Austria (crude).....	14,537	17,858	19,182	Sweden.....			68
Czechoslovakia.....	120	3,448	1,840	Korea—			
				Flake.....	1,906	2,394	43,992
				Other.....	20,412	28,406	

NOTE.—Graphite is also produced in U.S.S.R. (Russia) and in the United States.

(a) Information not available.

MAGNESITIC DOLOMITE

Magnesitic dolomite products to the value of \$486,084 were produced in Canada during 1935 as compared with \$382,927 in 1934.

"No magnesite, within the strict meaning of the term, is being produced in Canada at the present time, but magnesitic dolomite, composed of an intimate mixture of magnesite and dolomite, which, when properly processed, is proving more suitable than magnesite for many purposes, is quarried and processed at Kilmar and Harrington East, in Argenteuil county, Quebec. It is marketed in the caustic and in the dead-burned states; in the form of bricks; as finely ground refractory cement; and also in combination with chrome as an ingredient in certain types of refractories—one of the newest Canadian developments is the production of chemically bonded unburned bricks and shapes, which are proving satisfactory for the lining of rotary kilns and metallurgical furnaces; a number of new cements and refractory basic plastics have also been developed. The deposits of magnesitic dolomite in Argenteuil county, Quebec, are ample to supply magnesia products for domestic requirements for many years and also to support a large export trade; no other deposits of magnesitic dolomite or of magnesite of commercial grade are known in the eastern part of North America—recent trends in the making of magnesia products have been toward making of products which combine a high degree of refractoriness with ability to resist shock and to carry load at high temperature, and also toward the further development of chemically bonded unburned brick and shapes for lining metallurgical furnaces and cement kilns. Caustic-calcined magnesia is used for fettling the bottoms of basic, open-hearth furnaces, and for the construction of floors and floor tiles." (Report No. 773—Department of Mines, Ottawa.)

The United States Bureau of Mines reports that "owing to further recovery in the steel industry and minor expansion of other consuming industries, consumption of magnesite in the United States during 1935 increased 50 per cent over 1934. As imports remained at approximately the same level in 1935 as in 1934, domestic producers enjoyed the full benefit of the increased

demand; prices were virtually unchanged, and the status of magnesite compared with other high-grade refractories tended to improve; magnesite seems to be gaining ground for kiln linings in copper reverberatories and for several other types of high temperature service outside the steel industry, and in the steel industry it seems to be holding its own or even recapturing some of the business that had been taken by competitive materials. Increased demand for periclase, the super-quality of dead-burned magnesite, was reported, particularly in the manufacture of special alloy steels." (U.S. Bureau of Mines—Mineral Yearbook 1936.)

"In view of the facts that the steel industry is a large user of sintered magnesite and magnesite refractory bricks, at present wholly imported, and that magnesite occurs in considerable quantity in the north-eastern Transvaal, an investigation has been undertaken as to the possibility of producing suitable magnesite refractories from the Transvaal material. The results obtained so far have been very encouraging and the work is still in progress." (Department of Mines, 1935 report Union of South Africa.)

A report issued by the United States Department of Commerce contains the following particulars: "The total production of crude magnesite in Austria, both amorphous and crystalline, indicated a 16 per cent increase during 1935 over the previous year; production in 1935 amounted to 300,312 metric tons; production of dead-burned magnesite totalled 94,522 tons or a 46 per cent increase over the previous year's production of 64,726 tons. Caustic-calcined production in 1935 amounted to 43,733 tons. Austrian production of magnesite bricks and plates during 1935 amounted to 38,785 tons, about 35 per cent higher than in 1934. The dead-burned magnesite used for raw material for these products is included in the production figures for dead-burned.

"During 1935 crude magnesite was exported from Czechoslovakia to the amount of 9,539 metric tons, while shipments of the dead-burned totalled 30,307 tons; total exports of the two varieties during 1934 amounted to 8,848 and 24,236 tons, respectively.

"Official statistics indicate that exports of crude magnesite from Greece during 1935 amounted to 33,502 metric tons; calcined magnesite exports totalled 22,502 tons while those of dead-burned amounted to 9,191 metric tons."

Table 317.—Production of Magnesite* in Canada, 1926-1935

(For the years 1908 to 1925, see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	Tons	\$		Tons	\$
1926.....	4,571	137,431	1931.....	11,411	295,579
1927.....	7,337	230,309	1932.....	†	262,860
1928.....	13,195	346,990	1933.....	†	360,128
1929.....	18,809	491,170	1934.....	†	382,927
1930.....	13,336	336,162	1935.....	†	486,084

* Magnesitic dolomite.

† Owing to the limited number of firms, the data relating to quantity are not published.

Table 318.—Production in Canada, Imports and Exports of Magnesite*, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
Crude, mined.....	29,937		30,187		29,886	
Crude, calcined or treated.....	24,837		29,363		27,030	
PRODUCTION—Calcined and dead-burned.....	(d)	360,128	(d)	382,927	(d)	486,084
IMPORTS—						
Magnesia pipe covering.....		35,062		45,759		37,523
Magnesite (crude rock).....			(cwt. 4)	35	(cwt. 1)	
Magnesite firebrick.....		246,855		396,915		384,141
Magnesite, dead-burned, sintered, caustic-calcined or plastic magnesite.....	1,403	43,229	472	26,740	765	42,644
EXPORTS—						
Magnesite, calcined or dead-burned.....	2,320	63,056	1,997	56,670	1,577	43,338

* Including magnesitic dolomite.

(d) Not available for publication.

Imports of magnesite (magnesium oxide) in 1935 totalled 275,265 pounds valued at \$28,304 as compared with 390,001 pounds at \$34,462 in 1934.

Table 319.—Magnesite and Dolomite used in the Manufacture of Iron and Steel and their Products in Canada, 1931-1935

Year	Dolomite		Magnesite	
	Short tons	Value	Short tons	Value
1931.....	15,773	\$ 76,317	(a)	\$ (a)
1932.....	6,725	32,523	420	14,500
1933.....	6,874	30,557	399	14,798
1934.....	14,748	69,104	2,733	105,072
1935.....	18,394	79,914	3,891	149,987

(a) Information not available.

NOTE.—In addition to dolomite and magnesite the Canadian steel industry consumes large quantities of firebrick.

Table 320.—World Production of Magnesite, 1933-1935(Supplied by *Imperial Institute*)

(Long tons)

Country and description	1933	1934	1935	Country and description	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Union of South Africa—				Korea—			
Crude.....	1,471	1,641	1,462	Crude.....	(a)	3,118	2,372
Canada—				Italy—			
Crude.....	26,729	26,953	26,700	Crude.....	2,152	1,100	940
India—				Yugoslavia (Serbia only)—			
Crude.....	15,206	14,975	16,984	Crude.....	14,371	24,690	29,286
Australia—				Calcedine.....	5,561	9,611	11,475
Crude.....	9,720	15,923	16,071	Norway—			
FOREIGN COUNTRIES				Crude.....	1,975	2,461	2,486
Austria—				Calcedine (c).....	579	659	603
Crude.....	161,736	254,301	295,569	Bricks (c).....	483	660	787
Caustic (c).....	23,462	35,247	44,000	U.S.S.R. (Russia)—			
Dead-burned (c).....	63,260	63,704	85,000	Crude.....	361,000	474,000	(a)
Bricks (c).....	24,970	28,325	37,000	United States—			
Czechoslovakia—				Crude.....	96,596	90,154	158,173
Calcedine (b).....	18,988	23,151	28,763	Caustic (sales) (c).....	7,269	6,721	9,563
Crude (b).....	9,265	8,698	9,317	Dead-burned (sales) (c)	38,940	34,406	60,515
Greece—				Turkey—			
Crude.....	44,013	69,276	92,085	Crude.....	936	618	1,075
Caustic (c).....	16,039	13,943	18,807	"Manchoukuo"—			
Dead-burned (c).....	2,605	5,888	6,162	Crude.....	70,249	71,000	(a)
				Germany (Prussia)—			
				Crude.....	(a)	10,836	13,600

(a) Information not available.

(b) Exports less imports.

(c) Derived from crude shown, and not additional.

MAGNESIUM SULPHATE (EPSOM SALTS—NATURAL)

The commercial production of natural magnesium sulphate in Canada is confined at present to the province of British Columbia. Production during 1935 totalled 340 tons valued at \$7,965 as compared with 42 tons at \$1,100 in 1934; the output in both years represents material recovered by the Epsom Refineries Ltd., from deposits located in the Kamloops district. Operations were conducted at the deposits from August 1 to September 15, while refining was carried on at Ashcroft during the months of January, February, March, October and November; 575 tons of crude material were treated and various grades of refined products marketed. Magnesium sulphate has a medicinal value under the name of Epsom salts and it is also employed in the finishing of cotton fabrics and for weighting paper, silk and leather.

Canadian prices July, 1936 for magnesium sulphate were: B. P. bbls., 2½ to 3 cents per pound; technical, \$30 to \$40 per ton.

Table 321.—Production of Natural Magnesium Sulphate in Canada*, 1933-1935

Year	Tons	Value
		\$
1933.....	120	3,360
1934.....	42	1,100
1935.....	340	7,965

* Produced entirely in British Columbia.

Table 322.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and Tanning, 1932-1935

Year	Pharmaceutical preparations		Tanning*	
	Pounds	Value	Pounds	Value
		\$		\$
1932.....	622,459	28,073	181,811	2,418
1933.....	851,355	24,629	396,424	4,467
1934.....	816,830	33,793	228,281	4,789
1935.....	826,082	22,647	759,744	12,254

* Data not entirely complete.

MANGANESE BOG

Bog manganese consists mainly of oxide of manganese and water with usually some oxide of iron and often silica, alumina and baryta. Shipments of bog manganese from Dawson Settlement, Albert County, New Brunswick, during 1931 amounted to 77 tons valued at \$462. Some development work in 1934 was reported on a bog manganese deposit located at North Renous, New Brunswick. No commercial shipments of bog manganese have been made since 1931. The mineral is utilized chiefly in the ceramic industry.

MINERAL WATERS

Shipments of natural mineral waters from Canadian springs totalled 146,516 imperial gallons valued at \$16,590 in 1935 compared with 97,440 imperial gallons worth \$17,738 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec the Abenakis springs on the St. Francois river in Yamaska county; Potton springs in Brome county and the Coulombia spring at l'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot springs in the Fraser Valley and the Halcyon Hot springs on Arrow Lake are noted for their curative properties.

Table 323.—Production of Mineral Waters in Canada, 1926-1935

(For the years 1888 to 1925, see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	Imperial gal.	\$		Imperial gal.	\$
1926.....	215,356	29,721	1931.....	217,408	13,234
1927.....	303,530	14,624	1932.....	76,714	7,170
1928.....	269,045	33,498	1933.....	38,818	5,441
1929.....	321,905	16,139	1934.....	97,440	17,738
1930.....	227,141	24,481	1935.....	146,516	16,590

Table 324.—Production in Canada, Imports and Exports of Mineral Waters, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
Production by provinces—						
Quebec.....	9,024	3,094	75,665	16,116	126,616	15,113
Ontario.....	29,794	2,347	21,775	1,622	19,900	1,477
Total.....	38,818	5,441	97,440	17,738	146,516	16,590
IMPORTS—Mineral and aerated waters.....		77,552		87,618		85,514
EXPORTS—Mineral and aerated waters.....		5,572		5,322		4,627

PHOSPHATE

Shipments of Canadian mined phosphate during 1935 totalled 186 tons valued at \$1,103 as compared with 81 tons worth \$683 in 1934. Production in 1935 represented apatite recovered chiefly as a by-product mineral in the mining or dressing of mica in the provinces of Ontario and Quebec. No production of phosphate rock was reported in British Columbia in 1935.

The only important recorded occurrences of phosphate rock in Canada are the Precambrian apatite deposits of the Ottawa-Kingston region, in Ontario and Quebec, and the rather low-grade sedimentary phosphate of the Crowsnest district just west of the boundary between southern Alberta and British Columbia.

Phosphate rock is consumed largely in the production of superphosphate (for fertilizer), while the apatite mined in Eastern Canada is utilized in the manufacture of phosphorus.

United States quotations for phosphate per long ton, f.o.b. mines, December, 1935, were: Florida, pebble, for export, 77 to 76 per cent, \$7.25; 75 per cent, \$6.50; 75 to 74 per cent, \$6.25; 70 per cent, \$5; 68 per cent, \$4.50. Tennessee, ground lime phosphate, 85 per cent through 300 mesh, 34-30 per cent P_2O_5 , \$8.25 per short ton, bags extra.

Table 325.—Production of Phosphate in Canada, by Provinces, 1929-1935

Year	Quebec		Ontario		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1929.....	40	800			1,145	4,580	1,185	5,380
1930.....	40	760					40	760
1931.....								
1932.....	1,316	12,333					1,316	12,333
1933.....	105	805			2,109	4,670	2,214	5,475
1934.....	81	683					81	683
1935.....	116	1,043	70	60			186	1,103

Table 326.—Imports of Phosphate and Phosphate Products, 1933-1935

	1933		1934		1935	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
IMPORTS—						
Phosphate rock.....	18,351	74,527	31,775	165,240	63,514	234,580
Acid phosphate (not medicinal).....	1,241	192,213	1,257	172,279	397	55,449
Phosphorus and compounds, n.o.p.....	656	45,515	115	29,474	55	56,549
Superphosphate or acid phosphate of lime	54,437	503,474	79,288	775,578	67,204	595,330
Soda phosphate.....	2,949	156,204	3,986	195,751	1,870	124,328

Table 327.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1932-1935

Years	Superphosphate		Phosphate rock	
	Quantity	Value	Quantity	Value
	Short tons	\$	Short tons	\$
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133
1935.....	88,528	1,014,649	74,507	610,118

Table 328.—World Production of Phosphate Rock, 1933-1935

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935	Producing country	1933	1934	1935
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Tanganyika.....		205	191	U.S.S.R. (Russia) (d)....	200,000	376,000	758,000
Seychelles (exports).....	12,113	11,871	9,923	Algeria.....	578,470	523,804	594,326
Union of South Africa.....	1,163	76		Egypt.....	433,673	431,016	466,411
Canada.....	1,977	72	166	Madagascar.....	13,000	8,208	6,000
India.....	37	59	102	Morocco (French).....	1,048,822	1,171,150	1,134,117
Christmas Island.....	91,280	128,010	147,929	Tunis.....	1,780,000	1,738,000	1,470,000
Australia.....	96	207	235	Netherland West Indies			
Nauru Island.....	363,680	418,950	480,950	(exports).....	84,199	99,038	89,019
Ocean Island.....	185,575	211,250	228,100	United States.....	2,359,635	2,898,238	3,215,586
Total.....	656,000	771,000	868,000	French Indo-China.....		4,000	5,800
FOREIGN COUNTRIES				China (estimated).....	8,000	8,000	8,000
Belgium (b).....	24,733	14,158	(a)	Japan.....	34,193	55,600	89,807
Estonia.....	8,809	10,441	11,458	Netherlands East Indies..	7,821	4,934	11,371
France.....	74,450	65,700	(a)	Philippine Islands (c)....	3,048	(a)	(a)
Germany.....	(a)	723	177	Angaur Island (exports)...	73,250	63,783	76,878
Poland.....	6,250	7,534	(a)	Makatea.....	77,797	80,700	133,800
Spain.....	14,278	18,992	(a)	New Caledonia.....	6,000	2,000	9,000
				Roumania (e).....		1,200	(a)
				Total.....	6,800,000	7,600,000	8,100,000
				World's total.....	7,500,000	8,400,000	9,000,000

(a) Information not available.

(b) In addition phosphatic chalk was produced as follows:—

1933.....	59,840 long tons
1934.....	37,808 "

(c) Including guano.

(d) Apatite concentrate from Kola district only. In addition a quantity of low grade phosphate-rock is produced, the total output of all phosphate-rock including apatite was 2,389,000 long tons during 1934 and 2,214,000 long tons during 1935.

(e) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

POTASH

Natural potash salts are not yet mined or recovered on an extensive commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland county N.S., and at Gautreau, Westmorland county, N.B. A search for beds of economic importance has been made and results so far obtained have been sufficiently promising to warrant future work. Potassium chloride so far opened up at Malagash occurs in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite. Small shipments of potash-bearing salt have been made from the Malagash deposit; this salt was employed as a fertilizer.

"The Palestine Potash Ltd., Jerusalem, incorporated in England was granted a 75-year contract on January 1, 1930, for the exploitation of the Dead Sea. Potassium salts and bromine are produced by the natural evaporation of sea water containing, 16 feet below the surface, about 275 grams of salts per litre (K Cl, Na Cl, Mg Cl₂, Ca So₄, Ca Cl₂, Mg Br₂); the specific gravity of the water is 1.1725 at 73 degrees F. The salts are exported to England and the company has been able to reduce its operating costs and to extend its operations to the southern coast of the Dead Sea. A connection with the Gulf of Akaba enhances prospects for exports to India, Australia and South Africa. The Palestine Salt Co., Ltd., has extracted common salts from sea water on the coast, south of Haiga, since 1922.

"The foreign trade in German nitrate of potash has fluctuated in recent years, ranging between a high level of 36,247 metric tons in 1931 and a low of 23,111 tons in 1934. Exports recovered a few thousand tons in 1935 but relapsed again during 1936. Export prices have fallen from 342 marks per metric ton in 1930 to 182 marks at present. The United States is easily the leading foreign market for German potassium nitrate, taking around 10,000 tons annually in 1934-35, four times as much as Egypt, the second largest market. Australia and New Zealand, Brazil, the Netherlands, Great Britain, China, and Belgium bought more than 1,000 tons each." (United States Department of the Interior).

"Production of crude potash salts by all French mines in 1935 amounted to 1,983,000 metric tons, a decline of approximately 4 per cent from the total of 2,067,000 tons produced in 1934, according to information received by the United States Department of Commerce. Prices of potash in France were reduced 5 per cent in May, 1935, following an 8 per cent reduction in May, 1934." (Oil, Paint and Drug Reporter—New York).

The commercial recovery of potash salts from deposits in the Carlsbad area, New Mexico, has progressed rapidly since 1931; sylvite and carnallite, the chief minerals mined for potash in Germany and France, occur in this field. The discovery of these beds resulted from drilling conducted or supervised by the United States Department of Mines and Geological Survey.

Table 329.—Potash Salts Used in the Manufacture of Canadian Fertilizers, 1934 and 1935

	1934		1935	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Kainite and potash manure salts.....	5,822	103,781	3,332	28,689
Muriate of potash.....	10,283	362,460	16,054	378,239
Sulphate of potash.....	1,979	76,474	1,829	63,163

An analysis of the records received by the Bureau indicates that 20 plants were engaged in making mixed fertilizers in Canada during the year ending June 30, 1935; 26 were manufacturing fertilizer materials; 6 firms made both. Reports were received from 5 companies which operated as dealers only. There were 34 importers and 20 exporters.

Production of fertilizers totalled 387,905 short tons, of which 128,453 tons were mixed fertilizers. The principal fertilizer materials produced were calcium cyanamide totalling 107,059 tons, an increase of 29.3 per cent over the preceding year; sulphate of ammonia, 72,356 tons, a decrease of 10.4 per cent from the previous twelve-month output; superphosphate, 49,903 tons as compared with 45,179 tons for the twelve-month period ending June 30, 1934; ammonium phosphate, 24,395 tons, which was more than double the amount for the corresponding period of the year before. Other important fertilizer materials included bone meal and bone flour, 1,154 tons; tankage, 2,004 tons; dried blood, 743 tons; whale products, 542 tons; fish meal, 1,296 tons.

Imports of fertilizer materials totalled 195,297 tons, including superphosphate, 71,073 tons; muriate of potash, 45,628 tons; natural phosphate rock, 36,854 tons; nitrate of soda, 9,100 tons; basic slag, 8,615 tons; sulphate of ammonia, 8,253 tons; potash manure salts and kainite, 7,504 tons; sulphate of potash, 3,921 tons. Lesser amounts of cyanamide, calcium nitrate, nitrochalk, bone meal and bone flour, tankage, sheep manure, fish meal, ammonium phosphate, dried blood and other materials were also imported.

Exports of mixed fertilizers and fertilizer materials totalled 187,461 tons, consisting principally of cyanamide, 103,696 tons; sulphate of ammonia, 52,010 tons; ammonium phosphate, 12,178 tons; superphosphate, 9,435 tons; mixed fertilizers, 7,929 tons.

C. H. Robinson, B.A., Dominion Agricultural Chemist in describing the use of fertilizers in Canada states:—"The whole question of the use of fertilizers continues to receive a great deal of study by soil and crop technicians in this country, and throughout the world. It is realized that a great deal is yet to be learned from experimental work and that recommendations in regard to the use of fertilizers may change materially in years to come. A number of basic facts have already been determined, however, and these are centered around the proven three essential elements of plant food—nitrogen, phosphoric acid and potash. Further truths learned

in regard to the relationship between fertilizer treatment and the physical, chemical and biological composition of the soil may assume an important role in directing the use of fertilizers in the future."

Table 330.—Sales of Potash Salts for Fertilizer Purposes, Other than for Manufacture of Mixed Fertilizers, Years ended June 30, 1933, 1934 and 1935

	1933	1934	1935
	Tons	Tons	Tons
Muriate of potash.....	7,934	8,449	8,772
Sulphate of potash.....	478	410	521

In 1932, 31,069 pounds of crude iodine valued at \$81,741, in 1933, 43,607 pounds worth \$92,011, and in 1934, 42,489 pounds at \$50,057 were used in the manufacture of chemicals and allied products in Canada.

Table 331.—World Production of Potash

(Supplied by *Imperial Institute*)
(Long tons)

Producing country and description	1933	1934	1935	K ₂ O content or equivalent		
				1933	1934	1935
BRITISH EMPIRE						
Palestine—						
Chloride, 80% KCl.....	11,461	14,013	16,929	7,230	8,840	10,680
India—						
Nitrate (estimated).....	9,900	9,000	9,200	4,800	4,300	4,400
Australia—						
Alunite.....			2			
Total (estimated).....				12,000	13,100	15,100
FOREIGN COUNTRIES						
France (c)—						
K ₂ O equivalent—						
Sylvinite, etc.:—						
12–16%.....	131,015	118,810	60,728	321,353	372,946	341,784
18–22%.....	497,692	463,180	444,876			
30–40%.....	122,277	168,903	194,454			
50% and over.....	284,039	323,583	300,707			
Germany—						
Kainite, sylvinite, etc.....	6,614,188	8,648,231	10,138,217	945,654	1,228,691	1,434,889
Carnallite, etc.....	632,298	816,566	1,349,941	64,254	79,740	136,861
Italy—						
Alunite.....	526	1,580	2,059	50	160	400
Poland—						
Kainite.....	61,549	84,811	80,304	57,387	54,797	9,720
Sylvite.....	232,870	210,528	283,541			68,110
Langbeinit.....		1,447	13,694			1,640
Spain—						
Chlorides, etc.....	238,660	314,585	243,590	89,674	137,369	119,455
Nitrified earth.....	500	500	(a)	(a)	(a)	(a)
U.S.S.R. (Russia) (d)—						
Chloride, 85% KCl.....	34,962	149,697	(a)	30,500	93,500	(a)
" 98% KCl.....	1,322	7,864	(a)			
Mixed 65% KCl.....	21,808	102,211	(a)			
Egypt—						
Crude salts.....	4			(a)		
United States—						
Crude salts.....	297,420	246,189	319,620	128,016	128,877	172,137
Korea—						
Alunite (impure).....	26,790	55,439	80,223	(a)	(a)	(a)
Total.....				1,640,000	2,100,000	(a)
World's total.....				1,650,000	2,110,000	(a)

(a) Information not available.

(c) Crude salts mined were as follows—1933—2,162,000 long tons.

1934—2,021,942 "

1935—1,952,126 "

(d) Sylvinite (22% KCl) mined was—1933— 298,306

1934— 985,780

1935—1,300,000

PYRITES (Sulphur)

The sulphur content of pyrites shipped and sulphur recovered (SO_2) from non-ferrous smelter gas amounted in 1935 to 67,446 short tons valued at \$634,235 as compared with 51,537 tons worth \$515,502 in 1934. Production during both years came from the provinces of Quebec, Ontario and British Columbia.

Sulphur employed in the manufacture of sulphuric acid was recovered from salvaged smelter gas in Ontario and British Columbia. In Ontario Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur dioxide obtained from the smelter of the International Nickel Company, while in British Columbia the Consolidated Mining and Smelting Company of Canada, Limited, manufactured sulphuric acid at Trail, using the by-product gases of its metallurgical plants; this Company announced that a new plant to recover the remaining sulphur dioxide emitted from the zinc roasters was under construction in 1936. This plant consists of a waste heat recovery boiler plant an absorption plant, additional ammonia capacity, additional ammonium sulphate capacity and a sulphur reduction plant. It was expected that this plant would commence operation in June, 1936, when practically all the sulphur dioxide from the zinc plant operations would be recovered and marketed; the zinc plant gases contain approximately sixty per cent of the sulphur dioxide produced at Tadanac.

At Eustis, Quebec, the Consolidated Copper and Sulphur Co., Limited produced and shipped iron pyrites concentrates during 1935; these were consigned to chemical and other pyrites-consuming industries. In British Columbia, shipments of iron pyrites concentrates were made to both foreign and Canadian plants from Britannia Beach by the Britannia Mining and Smelting Company Limited.

Mining operations were resumed in August, 1936 at the Aldermac Mine located in Quebec; it was announced that the present indicated ore reserves were sufficient to ensure a ten-year output on the basis of 100 tons of sulphur per day (from pyrites) and that the operation of the Pilot Mill at Niagara Falls (testing the new sulphur process) had been successful thus far. (June, 1936.)

The use of anhydrite in England for the manufacture of sulphuric acid, ammonium sulphate, and special plasters is rapidly increasing. Canada is fortunate in having extensive deposits of this material favourably situated for commercial exploitation, the material from which has been proven by tests carried out by the Department of Mines, Ottawa, to be of excellent grade for the above purposes.

United States quotations for pyrites, December, 1935, were: per long ton unit of sulphur C. I. F. United States ports, guaranteed 48 per cent sulphur, Spanish 12 to 12½ cents nominal. Sulphur: per long ton for domestic market, \$18 f.o.b. Texas mines.

Table 332.—Production of Pyrites† in Canada, 1926-1935

(For the years 1886 to 1925, see Mineral Production of Canada, 1928)

Year	Pyrites	Sulphur content	Value	Year	Pyrites	Sulphur content	Value
	Tons	Tons	\$		Tons	Tons	\$
1926.....	17,845	8,975	63,899	1931.....	.....	50,107	429,457
1927.....	50,863	25,229	198,388	1932.....	.....	53,172	470,014
1928.....	68,836	38,589	321,033	1933.....	.....	57,373	510,299
1929.....	.....	42,781	350,843	1934.....	.....	51,537	515,502
1930.....	.....	37,730	314,835	1935.....	.....	67,446	634,235

† Since 1928 includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making and also elemental sulphur produced at Trail, B.C. since 1933.

Table 333.—Production in Canada, Imports and Exports of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid Made from Smelter Gases, 1934 and 1935

—	Pyrites†			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
1934			\$		\$		\$
Quebec.....	9,868	4,908	50,398			4,908	50,398
Ontario.....				14,598	145,980	14,598	145,980
British Columbia.....	*27,288	(a) 593	4,744	31,438	314,380	32,031	319,124
Canada.....	37,156	5,501	55,142	46,036	460,360	51,537	515,502
1935							
Quebec.....	15,042	7,370	47,779			7,370	47,779
Ontario.....				13,292	132,920	13,292	132,920
British Columbia.....	14,163	7,152	57,216	(b) 39,632	396,320	46,784	453,536
Canada.....	29,205	14,522	104,995	52,924	529,240	67,446	634,235

IMPORTS—	1934		1935	
	Tons	\$	Tons	\$
	Brimstone or sulphur, crude or in roll or flour.....	157,697	2,589,311	136,675	2,297,650
Sulphuric acid.....	82	9,938	83	9,349
EXPORTS—				
	Tons	\$	Tons	\$
	Sulphur contained in pyrites.....	9,821	94,623	7,610	48,446
Sulphuric acid.....	953	13,272	1,027	13,736

* Includes 26,089 tons shipped for fluxing only.

† Includes iron pyrites concentrates made from copper ores.

(a) Sulphur content of pyrites used for acid manufacture only.

(b) Includes sulphur recovered in the elemental form and sulphur in the gaseous state for acid manufacture.

Table 334.—Sulphur (*) Used in Canadian Chemicals and Allied Products and Wood-Pulp Industries, 1932-1935

—	Chemicals and allied products		Wood—Pulp	
	Pounds	Value	Tons	Value
1932.....	21,207,500	\$ 228,805	105,521	\$ 2,495,137
1933.....	26,703,964	300,564	121,400	2,828,686
1934.....	37,439,226	405,428	127,541	2,932,928
1935.....	33,462,024	366,716	126,958	2,960,761

(*) Does not include use of sulphur recovered from smelter gases.

Table 335.—World Production of Pyrites* (including Cupreous Pyrites)

(Supplied by Imperial Institute)

(Long tons)

Producing country	1933	1934	1935	Estimated sulphur content		
				1933	1934	1935
BRITISH EMPIRE						
United Kingdom.....	1,132	2,145	4,194	(a)	(a)	(a)
Southern Rhodesia.....	10,905	11,528	12,040	4,400	4,600	4,800
Union of South Africa.....	3,606	15,518	24,672	1,600	6,900	11,096
Canada (c).....	52,325	(d) 33,175	26,000	25,159	(d) 4,912	12,966
Cyprus.....	208,845	199,472	357,282	105,747	99,736	178,641
Australia.....	1,498	12,030	25,555	(a)	(a)	(a)
Total.....	278,000	274,000	450,000			
FOREIGN COUNTRIES						
Bulgaria.....		20	(a)		9	(a)
Czechoslovakia.....	15,182	17,367	20,000	6,377	7,408	8,000
Finland (e).....	37,201	70,043	81,712	17,112	32,220	36,800
France.....	166,577	158,517	147,758	74,721	69,042	66,000
Germany.....	186,652	222,079	272,414	80,287	95,398	115,666
Greece.....	181,529	148,566	130,200	88,331	71,549	63,000
Italy.....	721,129	799,565	820,240	330,421	366,000	372,000
Norway.....	850,921	945,722	879,401	376,692	418,009	399,856
Poland.....	61	1,141	720	26	491	310
Portugal.....	207,333	215,937	211,362	100,000	100,000	100,000
Roumania.....	11,921	3,938	9,699	6,364	1,615	5,000
Spain.....	2,183,866	2,039,682	2,250,000	1,300,000	1,200,000	1,300,000
Sweden.....	84,932	98,984	105,128	32,960	39,461	42,398
Yugoslavia.....	17,489	22,157	82,218	7,300	10,000	37,000
U.S.S.R. (Russia).....	372,200	375,900		(a)	(a)	(a)
Algeria.....	15,872	13,425	12,125	7,364	6,175	5,610
United States (b).....	284,311	432,524	506,215	107,778	167,645	199,457
China.....	42,000	40,000	(a)	(a)	(a)	(a)
Japan.....	888,865	1,073,261	1,317,745	400,000	480,000	580,000
Korea.....	14,289	39,392	54,733	(a)	(a)	(a)
"Manchoukuo".....	1,645	3,000	(a)	(a)	(a)	(a)
Total.....	6,300,000	6,700,000	7,300,000			
World's total.....	6,600,000	7,000,000	7,800,000			

(a) Information not available.

(b) Includes by-product pyrite from zinc operations in Wisconsin and New York, and pyrite and pyrrhotite concentrates from copper operations in Tennessee.

(c) Includes pyrite ore, also concentrates made from copper ores.

(d) Includes 23,294 tons shipped for fluxing only, this item is not included in the Sulphur content figure.

(e) Pyrite concentrate only.

SULPHURIC ACID

Substantial improvement was recorded in Canada's heavy chemical industry during 1935 when production reached a value of \$19,012,615 compared with \$16,494,139 in 1934. This gain of 15 per cent brought the value to the highest point since 1930.

Production of sulphuric acid during 1935 totalled 222,410 short tons, which was the highest reported for any year and exceeded the 205,325 tons produced in 1934 by 8 per cent and the 148,142 tons made in 1933 by 50 per cent.

Sales of sulphuric acid by the producers during 1935 totalled 85,227 tons worth \$1,171,413 and stocks on hand on December 31, 1935, amounted to 7,758 tons. The remainder of the output was used in the producers' own works, chiefly at Trail, British Columbia, for the manufacture of fertilizers and at Copper Cliff, Ontario, for making nitre cake for use in the nickel smelter at that point.

An estimate of the Canadian consumption of sulphuric acid may be made by adding the production of 222,410 tons to the imports of 83 tons and deducting the exports of 1,027 tons. This calculation shows that the apparent consumption in 1935 totalled 221,466 tons.

Imports of acids of all kinds were valued at \$1,273,088 in 1935. Stearic acid, citric acid, tartaric acid and boracic acid were the more important items. Exports of acids were appraised at \$2,884,389.

Imports of inorganic chemicals totalled \$8,211,163 in 1935, including, among the more important items, sodium cyanide, sodium nitrate, zinc oxide, sulphate of alumina, liquid chlorine, calcium chloride, sodium bicarbonate, copper sulphate, tin bichloride, borax, caustic soda, sodium bichromate, sodium phosphate, litharge and sodium silicate. Exports of inorganic chemicals amounted to \$8,282,243, mostly calcium cyanamide and sodium compounds.

Table 336.—Production, Imports, Exports and Apparent Consumption of Sulphuric Acid in Canada, 1923-1935

(Short tons)

Years	Pro- duction	Imports	Exports	Apparent con- sumption(*)
1923.....	87,150	291	12,203	75,238
1924.....	71,991	47	7,678	64,360
1925.....	83,396	51	19,179	64,268
1926.....	108,229	53	28,136	80,146
1927.....	98,470	53	17,407	81,116
1928.....	96,227	54	13,329	82,952
1929.....	110,748	111	8,397	102,462
1930.....	107,352	150	571	106,931
1931.....	119,540	80	996	118,624
1932.....	136,846	62	721	136,187
1933.....	148,142	58	1,013	147,187
1934.....	205,325	82	953	204,454
1935.....	222,410	83	1,027	221,466

(*) No allowance made for changes in stocks on hand.

SILICA BRICK

Production of silica brick in Canada during 1935 totalled 2,461 M valued at \$96,194 as compared with 2,528 M worth \$85,945 in 1934. The output in both 1934 and 1935 originated in the plants of the Dominion Steel and Coal Company, Limited, Sydney, Nova Scotia, and the Algoma Steel Corporation Limited, Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized as a refractory in furnace construction. Imports of silica brick containing not less than 90 per cent silica were evaluated at \$215,500 in 1935.

Table 337.—Production of Silica Brick in Canada, 1926-1935

Year	M	Value	Year	M	Value
		\$			\$
1926.....	2,665	130,702	1931.....	900	35,746
1927.....	1,791	79,527	1932.....	93	4,304
1928.....	3,224	155,502	1933.....	636	23,185
1929.....	3,951	173,581	1934.....	2,528	85,945
1930.....	2,418	97,379	1935.....	2,461	96,194

SODIUM CARBONATE (NATURAL)

Commercial shipments of natural sodium carbonate from Canadian deposits totalled 242 tons valued at \$2,430 in 1935 as compared with 244 tons worth \$1,920 in 1934. Production of this mineral comes entirely from British Columbia where the B. C. Sodium Syndicate, with headquarters at Cherry Creek, 12 miles west of Kamloops, continued the operation of its sodium-carbonate plant located at a small lake two miles north-east of the Kamloops-Ashcroft highway. Several car loads of sodium-carbonate crystal were shipped to Calgary and Vancouver soap factories during 1935.

Sodium carbonate, or soda ash, has many industrial uses, being employed in the manufacture of glass, soap, and in the purification of oils, etc.

Table 338.—Production* of Sodium Carbonate (Natural) in Canada, 1926-1935

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	595	5,370	1931.....	712	7,351
1927.....	805	9,995	1932.....	495	5,450
1928.....	519	4,922	1933.....	559	5,773
1929.....	600	8,100	1934.....	244	1,920
1930.....	364	4,550	1935.....	242	2,430

* Output confined to British Columbia.

Table 339.—Imports of Bicarbonate of Soda and Soda Ash, 1931-1935

Years	Bicarbonate of Soda		Soda Ash or Barilla	
	Pounds	\$	Pounds	\$
1931.....	10,931,335	188,268	1,647,304	25,771
1932.....	10,592,208	196,841	1,803,951	27,751
1933.....	11,716,431	211,065	1,616,483	23,256
1934.....	11,918,011	205,058	2,311,498	32,258
1935.....	12,009,724	207,325	2,647,572	37,995

Table 340.—Consumption of Soda Ash in the Canadian Chemicals and Allied Products Industries and Manufactures of Non-Metallic Minerals, 1932-1935

Year	Chemical industry†		Manufactures of non-metallic minerals*	
	Pounds	Value	Pounds	Value
		\$		\$
1932.....	11,421,879	193,422	43,545,840	598,834
1933.....	12,221,928	191,639	38,336,000	505,152
1934.....	21,879,170	327,214	49,260,000	644,655
1935.....	24,850,734	370,040	47,847,466	632,715

* Includes coke and gas, glass and petroleum refining.

† Includes acids, salts, explosives, soap, etc.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Production of natural sodium sulphate in Canada is confined to the province of Saskatchewan where production in 1935 totalled 44,817 short tons valued at \$343,764 as compared with 66,821 tons at \$587,986 in 1934.

The material mined is either hydrated sodium sulphate, known as Glauber's salt, or anhydrous sodium sulphate, known to the trade as "Salt cake." It occurs as crystals (Glauber's salt) or in the form of partially saturated or saturated brines in many lakes throughout Western Canada.

Sodium sulphate finds its principal use in the pulp and paper industry for the manufacture of "Kraft paper" by the sulphate process, in the manufacture of glass, in the dyes industry, in the smelting of nickel-copper ores, and as one of the raw materials in the manufacture of sodium carbonate.

It is encouraging to note the progress made in this industry in the past few years. The investigation of these deposits was started by the Mines Branch, Ottawa, in 1921, and over 120,000,000 tons of hydrous salt were proved in the few deposits examined in detail. At the present time the operating plants are capable of producing over 600 tons of dried salt per day.

The Mines Branch, Department of Mines, Ottawa, states that "the product from these western deposits should find a rapidly extending market, as the by-product material from the manufacture of hydrochloric acid is each year decreasing in volume owing to the manufacture of the acid synthetically; with the steady improvements being made in methods of refining, thus bettering quality of the product and reducing costs of production and with improved facilities for shipment via Churchill, Manitoba, the possibility of the product from these deposits competing in European and other foreign markets looks decidedly promising."

Returns were received from 6 firms engaged in the production of natural sodium sulphate in Saskatchewan during 1935; the industry reported an average of 104 employees and distributed \$87,355 in salaries and wages. The value of fuel and process supplies consumed during 1935 amounted to \$157,221.

Table 341.—Production of Natural Sodium Sulphate in Canada* 1926-1935

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1926.....	6,775	13,550	1931.....	44,957	421,097
1927.....	5,659	11,319	1932.....	22,466	271,736
1928.....	6,016	68,804	1933.....	50,080	485,416
1929.....	5,018	64,112	1934.....	66,821	587,986
1930.....	31,571	293,847	1935.....	44,817	343,764

* Produced entirely in Saskatchewan.

Table 342.—Salt Cake Used in the Manufacture of Canadian Wood-Pulp and in the Acids, Alkalies and Salts Industry, 1932-1935

Year	Acids, alkalies † and salts industry		Wood-pulp	
	Tons	Value	Tons	Value
		\$		\$
1932.....	94	1,811	24,301	489,343
1933.....	9,968	146,201	29,563	580,251
1934.....	26,075	368,576	34,559	655,905
1935.....	22,485	316,734	35,524	645,001

In addition to the consumption listed above, there is a relatively small quantity used in the medicinal and pharmaceutical industry.

† Includes that used in the treatment of nickel-copper matte.

Table 343.—Imports of Glauber's Salt and Salt Cake into Canada, 1931-1935

Years	Glauber's Salt		Salt Cake (Sulphate of Soda)	
	Pounds	\$	Pounds	\$
1931.....	1,999,042	10,838	17,321,652	97,215
1932.....	1,806,882	11,027	8,865,730	51,925
1933.....	1,791,011	13,237	5,191,036	34,371
1934.....	1,266,665	8,853	21,154,815	123,980
1935.....	(*) 3,167,715	26,591	(a) 10,352,070	49,354

(*) Of the 1935 imports 2,507,439 pounds came from Germany and 242,446 pounds from the United States.

(a) Of the 1935 imports 6,512,848 pounds came from the United States, 2,239,872 pounds from Germany, and 1,599,350 pounds from the United Kingdom.

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported-Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this chapter are those industries producing structural materials of non-metallic composition. During the depression years, immediately following 1929, these important branches of the Canadian mineral industry suffered severe economic losses. Production declined and employment fell to a relatively low level. Shipments of cement, lime, stone, sand and gravel totalled \$58,534,834 in 1929; this high value was succeeded by unbroken annual decreases to \$16,696,683 in 1933, from which year recovery has been slow but definite with a production value of \$23,215,400 being recorded for 1935.

Improvement during 1935 was more pronounced in the stone and sand and gravel industries in which shipments were apparently stimulated by an increased activity in highway and railway ballasting. Production of structural materials is very sensitive to any reaction in the various construction fields. In 1929 the value of construction contracts awarded in the Dominion totalled \$576,652,000 whereas by 1933 the value had fallen to \$97,289,800; this, as with the structural materials industries, was followed by a steady improvement, until 1935 in which year the value of contracts awarded had risen to \$160,305,000.

Table 344.—Value of Construction Contracts Awarded, by Provinces, 1932-1935

(Maclean Building Reports Ltd.)

Provinces	1932	1933	1934	1935
	\$	\$	\$	\$
Maritimes.....	9,339,500	7,218,700	9,968,600	14,373,500
Quebec.....	52,525,300	32,539,200	34,135,500	44,471,900
Ontario.....	49,291,800	42,573,400	63,358,300	73,872,800
Manitoba.....	4,503,500	2,138,000	3,905,000	8,744,400
Saskatchewan.....	2,705,200	775,200	1,563,200	3,841,300
Alberta.....	5,948,200	2,825,900	3,489,400	5,893,000
British Columbia.....	8,558,900	9,219,400	9,391,500	12,108,100
Canada.....	132,872,400	97,289,800	125,811,500	160,305,000

Table 345.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1932-1935

Province	1932	1933	1934	1935
	\$	\$	\$	\$
Nova Scotia.....	432,075	378,320	511,026	1,660,981
New Brunswick.....	779,492	644,570	669,726	1,241,957
Quebec.....	8,062,951	5,747,715	6,115,682	7,241,494
Ontario.....	8,827,968	7,340,086	8,988,681	8,894,538
Manitoba.....	1,259,733	667,012	761,742	1,459,614
Saskatchewan.....	176,681	111,838	260,030	269,320
Alberta.....	1,039,093	654,334	843,629	973,774
British Columbia.....	1,820,290	1,152,712	1,136,245	1,473,722
Canada.....	22,398,283	16,696,687	19,286,761	23,215,400

Table 346.—Production, Imports, Exports, and Apparent Consumption of Clay Products and Other Structural Materials in Canada, 1933-1935

Item		Production	Imports	Exports	Apparent consumption
		\$	\$	\$	\$
Cement, Portland.....	1933	4,536,935	142,739	47,369	4,532,305
	1934	5,667,946	149,715	55,181	5,662,480
	1935	5,580,043	177,181	44,365	5,612,859
Clay and clay products.....	1933	2,262,835	4,061,265	141,552	7,082,548
	1934	2,680,410	5,935,805	186,350	8,429,856
	1935	3,012,563	6,438,042	363,164	9,087,441
Lime.....	1933	2,432,306	4,444	192,029	2,244,721
	1934	2,745,797	5,118	151,983	2,598,932
	1935	2,925,791	9,181	50,296	2,884,676
*Sand and gravel.....	1933	4,464,285	232,611	15,801	4,681,095
	1934	4,035,477	283,088	17,079	4,301,486
	1935	6,389,440	364,693	21,446	6,732,687
Slate.....	1933	3,750	(a) 30,567	.....	34,317
	1934	4,802	(a) 40,966	.....	45,768
	1935	4,329	(a) 36,388	.....	40,717
Stone.....	1933	2,996,576	243,930	91,340	3,149,166
	1934	4,152,329	447,668	104,969	4,495,018
	1935	5,303,234	442,891	110,895	5,635,230
Total.....	1933	16,696,687	5,515,556	488,091	21,724,152
	1934	19,286,761	6,762,360	515,571	25,533,540
	1935	23,215,400	7,368,376	590,166	29,993,610

* Sand and gravel imports include silica sand for glass and carborundum manufacture and for use in steel plants. This silica sand was valued at \$160,131 in 1933, \$226,188 in 1934 and \$282,930 in 1935.

† Includes cement manufactures.

(a) Includes slate manufactures.

CEMENT

Shipments from Canadian cement plants during 1935 totalled 3,648,086 barrels valued at \$5,580,043 as compared with 3,783,226 barrels worth \$5,667,946 in 1934 and 3,007,432 barrels at \$4,536,935 in 1933. The 1935 production, compared with that of the preceding year, represents a decrease of 3.6 per cent in quantity and 1.6 per cent in value.

During 1935 cement was produced in the provinces of Quebec, Ontario, Manitoba, Alberta, and British Columbia and of the total Canadian shipments the mills of Quebec contributed 1,751,012 barrels or 48 per cent and those of Ontario, 1,243,836 barrels or 34 per cent. Employment within the industry showed a slight improvement, the number of employees increasing to 924 from a total of 860 in 1934. Salaries and wages paid amounted to \$1,027,416 as against \$1,009,686 for 1934.

In 1935 Canadian cement mills consumed 818,443 tons of limestone, 21,611 tons of gypsum, 78,477 tons of Canadian coal and 53,338 tons of imported coal; 20 rotary kilns were in operation with the wet process being utilized in 6 plants and the dry in 2. Total daily kiln capacity for 1935 was reported at 32,650 barrels, representing a considerable decrease as compared with 1934; this decline in capacity resulted largely from plant renovation and installation of new equipment.

Imports of Portland cement and hydraulic or water lime totalled 17,738 barrels valued at \$60,079 as compared with 14,341 barrels worth \$45,548 in 1934.

Exports of Portland cement amounted to 55,607 barrels worth \$44,365 as against 70,046 barrels at \$55,181 in 1934 and of the 1935 exports the greater part went to Newfoundland and islands of the British West Indies.

A publication "The Manufacture of Portland Cement" by the Canada Cement company Limited contains the following information:—"Cement is manufactured from limestone and clay generally. The limestone can be replaced by marl or blast furnace slag. The clay can be replaced by shale. Sometimes natural cement rock is used, i.e., natural rock which has the necessary chemical constituents for Portland cement. There are two distinct methods of manufacture known as the "dry process" and the "wet process." They differ in procedure but not in principle. In the dry process, the materials are finely ground and mixed dry before

entering the kiln. In the wet process, water is added to the raw materials and they are ground together wet and enter the kiln as a soupy mixture called "slurry." This process, of course, gives a better and more intimate mixture and can be controlled and handled easier; it is the most modern method . . . Cement and concrete, as we know them today, are comparatively new construction materials, yet basically, they are really ancient. The Egyptians, Romans and Carthaginians all knew and used cement. After the Roman period, we find no record of cement for over ten centuries. All the old knowledge seems to have been completely lost for some reason. In 1824, Joseph Aspdin, a stone mason of Leeds, England, invented Portland cement as we now know it. Since Aspdin's time, the process of manufacture has changed greatly and the product much improved."

In a review of the industry during the fiscal year ending November 30, 1935, one of the larger Canadian cement companies commented as follows:—"The volume of cement sold in Canada during the year just closed was slightly lower than in the previous year. There was considerable improvement in the use of cement for buildings and small uses, but on the other hand, there was a falling-off in road and street paving and in municipal work generally. While the increase in the one and the decline in the other nearly balanced, there was, on the whole, a small decrease in consumption. It is difficult in times like these to make forecasts. Nevertheless, it is true that the construction industry in the other countries of the world, outside of Canada, is showing considerable activity, in some countries reaching boom conditions. It would seem, therefore, that at least a moderate revival of the industry, particularly in private building, is overdue in Canada. It is not expected that progress will be rapid, but there are indications of a turn towards improvement."

"The use of calcium chloride as an admixture in concrete" is the subject of bulletin No. S T-23, released by the Structural and Technical Bureau of the Portland Cement Association. The bulletin lists the following conclusions from tests reported by the United States Bureau of Standards:—

"1. The setting times of cements at 70 degrees F. were decreased by addition of increasing amounts of calcium chloride. Average initial set of commercial cements was reduced from three hours, 15 minutes to 1 hour, 12 minutes by addition of 2 per cent calcium chloride.

"2. Addition of calcium chloride increased strength of all cements at all ages up to one year, beyond which tests were not made. Percentage increase was much greater for early ages and for the lower temperatures than for later periods and higher temperatures.

"3. Most effective amounts of commercial calcium chloride at curing temperatures studied were found to be as follows: at 40 degrees F., 2 per cent for all cements; at 70 degrees F., 2 per cent for normal Portland and white cements, 1½ per cent for high-early strength cement; at 90 degrees F., 1½ per cent for all cements.

"4. Workability of concrete increased with additions of calcium chloride up to three per cent.

"5. Addition of calcium chloride markedly increased rapidity with which heat evolved during hydration, although there was not much change in total heat developed at 24 hours.

"There are no tests or other evidence indicating that a small addition of calcium chloride to concrete has any corrosive effect on embedded reinforcing.

"Calcium chloride, then, can be used most advantageously in cold weather to reduce the time of protection required with covers and artificial heat or to reduce water to minimum, as reductions in water improve strength and other qualities." (Engineering and Contract Record—Toronto).

Table 347.—Capital Employed in the Cement Industry in Canada, 1934 and 1935

	1934	1935
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—		
(a) Present cash value of the land.....	48,113,855	11,737,454
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....		35,237,883
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	1,052,187	862,095
(d) Inventory value of finished products on hand.....	1,175,361	1,058,100
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	3,071,597	3,558,472
Total.....	53,413,000	52,451,004

Table 348.—Employees, Salaries and Wages in the Cement Industry in Canada, 1934 and 1935

Class	1934		1935	
	Number of employees	Salaries and wages	Number of employees	Salaries and wages
SALARIED EMPLOYEES.....	84	\$ 161,118	78	\$ 150,587
WAGE EARNERS.....	776	848,568	846	876,829
Total.....	860	1,009,686	924	1,027,416

Table 349.—Wage Earners on 15th of Each Month or Nearest Representative Date, 1934 and 1935

Month	1934	1935
January.....	556	705
February.....	565	660
March.....	561	671
April.....	685	687
May.....	846	802
June.....	885	920
July.....	965	937
August.....	883	947
September.....	861	1,042
October.....	865	964
November.....	844	943
December.....	789	896

Table 350.—Production and Apparent Consumption of Cement in Canada, 1926-1935

Year	Sold or used		Apparent consumption
	Barrels	Value	Barrels
		\$	
1926.....	8,707,021	13,013,283	8,442,203
1927.....	10,065,865	14,391,937	9,835,525
1928.....	11,023,928	16,739,163	10,790,650
1929.....	12,284,081	19,337,235	12,105,950
1930.....	11,032,538	17,713,067	10,977,238
1931.....	10,161,658	15,826,243	10,085,986
1932.....	4,498,721	6,930,721	4,466,738
1933.....	3,007,432	4,536,935	2,974,020
1934.....	3,783,226	5,667,946	3,727,521
1935.....	3,648,086	5,580,043	3,610,217

Table 351.—Output, Sales, Imports, Exports and Consumption of Cement in Canada, 1933-1935

	1933		1934		1935	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
OUTPUT.....	2,410,518		3,484,233		3,487,602	
SOLD OR USED.....	3,007,432	4,536,935	3,783,226	5,667,946	3,648,086	5,580,043
STOCKS, DEC. 31.....	1,830,928		1,562,501		1,402,017	
IMPORTS—						
Portland cement.....	19,119	37,768	14,341	45,548	17,738	60,079
Manufactures.....		4,971		4,167		17,102
EXPORTS PORTLAND CEMENT.....	52,531	47,369	70,046	55,181	55,607	44,365
APPARENT CONSUMPTION.....	2,974,020		3,727,521		3,610,217	

1 barrel=350 pounds.

Table 352.—Producers Sales of Cement in Canada, by Provinces, 1933-1935

Province	1933		1934		1935	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
Quebec.....	1,517,555	2,128,900	1,613,641	2,294,847	1,751,012	2,472,008
Ontario.....	1,095,845	1,587,812	1,702,128	2,403,590	1,243,836	1,752,148
Manitoba.....	129,540	295,351	181,166	411,247	266,457	604,857
Alberta.....	149,206	299,530	163,946	326,253	219,555	436,914
British Columbia.....	115,286	225,342	122,345	232,009	167,226	314,116
Canada.....	3,007,432	4,536,935	3,783,226	5,667,946	3,648,086	5,580,043

Table 353.—Kilns Used by Canadian Cement Industry, 1931-1935

Year	Rotary	Vertical	Total daily capacity
	No.	No.	Barrels
1931.....	43	1	42,422
1932.....	47	.....	43,822
1933.....	41	.....	43,622
1934.....	41	.....	43,822
1935.....	20	.....	32,650

Table 354.—Limestone and Gypsum Used in Canadian Cement Plants, 1931-1935

Year	Limestone	Gypsum
	Tons	Tons
1931.....	2,489,147	56,677
1932.....	1,141,376	27,538
1933.....	616,364	13,319
1934.....	806,546	19,172
1935.....	818,443	21,611

THE CEMENT PRODUCTS INDUSTRY

Manufacturers of cement products reported an improvement of 10 per cent in business during 1935 as compared with 1934, but the value of output at \$1,154,138 was lower than for any other year since annual records were commenced in 1919.

Quite a number of factories were idle throughout 1935 or operated for only a few days and were not asked to submit detailed reports. Of the 94 establishments which were included in the compilations, 57 were in Ontario, 24 in Quebec, 6 in British Columbia, 2 in New Brunswick, 2 in Alberta, and 1 in each of Nova Scotia, Manitoba and Saskatchewan. The works in Ontario accounted for 67 per cent of the total output and factories in Quebec accounted for 23 per cent.

Products of the industry in 1935 included cement pipe of all kinds worth \$305,203, cement hollow building blocks worth \$277,923, artificial stone worth \$148,486, cinder blocks worth \$102,615 and other articles such as laundry tubs, stucco, burial vaults, Haydite blocks and slabs, cement bricks, etc. Each of the above values was considerably above the corresponding figure for 1934.

Table 355.—Products Made, by Provinces, 1935

Products	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Cement bricks.....	10,562	6,616	.....	.....	17,178
Hollow building blocks.....	45,088	228,832	800	3,203	277,923
Cement drain pipe, sewer pipe, water pipe and culvert tile.....	81,321	148,353	46,762	28,767	305,203
Artificial stone.....	99,998	43,307	5,016	159	148,486
Cement laundry tubs.....	.....	29,374	5,285	.....	34,659
Cinder blocks.....	8,135	94,480	.....	.....	102,615
Stucco.....	4,500	7,323	5,847	4,988	22,658
All other products.....	19,800	216,304	8,678	640	245,422
Total.....	269,404	774,589	72,388	37,757	1,154,138

Table 356.—Materials Used in Manufacturing Cement Products, by Provinces, 1935

Materials	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Portland cement.....	37,180	156,937	9,350	6,931	210,398
Quicklime.....	364	4		123	491
Sand.....	6,668	23,133	993	1,597	32,391
Gravel.....	2,162	22,593	2,344	1,625	28,724
Crushed stone.....	10,870	7,230	395	60	18,555
Cinders.....	981	6,875			7,856
Reinforcing steel.....	8,664	10,022	5,212	2,990	26,888
Other materials.....	8,159	102,449	6,344	429	117,381
Boxes, crates, lumber, etc.....	6,671	9,629	193	119	16,612
Total.....	81,719	338,872	24,831	13,874	459,296

CLAY AND CLAY PRODUCTS INDUSTRY

The Clay and Clay Products Industry in Canada is classified into two divisions: (1) production from domestic clays which includes the production of refractories, building brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe and pottery, and (2) production from imported clays which includes the manufacture of porcelain insulators, refractories, earthenware, pottery and ceramic floor and wall tile.

There were 159 plants representing a total capital investment of \$24,951,320 operating in the domestic and imported clay products industries in Canada during 1935. These two industries provided employment for 2,623 persons during the year; their earnings totalled \$2,252,136. The combined production in 1935 was valued at \$5,187,540 as compared with \$4,603,628 in 1934.

(1) Production from Domestic Clays

Domestic clay and domestic clay products sold by Canadian producers totalled \$3,012,563 in 1935 as compared with \$2,680,410 in 1934. The value of the 1935 shipments representing a 12.4 per cent increase over the preceding year was the greatest since 1932 and indicates a definite revival in construction; this was particularly apparent in a 12.4 per cent increase over 1934 in the sales' value of building brick.

Distinct increases, as compared with 1934, were also recorded in the quantity and value of various other clay products of a structural nature, including hollow blocks, roofing tile, and sewer pipe. It is also interesting to note a 118 per cent increase during 1935 in the tonnage of domestic fireclay produced.

Ontario continued to hold a predominant position among the provinces as a producer of clay products, the value of its output in 1935 totalling \$1,370,225, or 45.5 per cent of the entire Canadian production. The value of production in Quebec amounted to \$593,162 or 19.7 per cent, while Alberta ranked third in importance with a production valued at \$326,679. The other clay-producing provinces include Nova Scotia, New Brunswick, Saskatchewan and Manitoba, all of which, in 1935, realized increases over 1934 in the value of their clay product shipments.

During 1935 the domestic clay products industry distributed \$1,387,924 in salaries and wages to 1,728 employees as compared with \$1,262,977 to 1,572 employees in 1934. The industry consumed \$679,578 in fuel, electricity and process supplies during 1935, of which \$417,048 represented expenditures for coal, \$86,302 for wood, \$91,836 for electricity, \$60,583 for various process supplies and \$11,459 for natural gas.

Imports of clay and clay products into Canada during 1935 totalled \$6,438,042 as compared with \$5,935,805 in 1934 while exports of building brick, clay and other clay manufactures in 1935 amounted to \$363,164 as against \$186,359 in the preceding year.

Report No. 773 issued by the Mines Branch, Department of Mines, Ottawa, contains the following information:—"There is a steady demand for various grades of china clay in Canada for use in the manufacture of paper and rubber as well as in the ceramic industry. Ball clays are used in the ceramic industry as a bonding clay in the manufacture of porcelain and similar compounded bodies. While the market in Canada is not large, it is growing and there are also good prospects of developing a profitable export market in the United States. Ball clays of high bond strength occur in extensive deposits in Southern Saskatchewan. Deposits of high-grade, white-burning clays occur on Mattagami, Abitibi, and Missinaibi Rivers in Northern

Ontario. Some of these clays may be classed as ball clays and others as china clays; recent developments at two points in this area will probably result in a small production of clay in the near future. The only place where china clay has been produced commercially in Canada is near St. Rémi d'Amherst, Quebec. . . There are numerous occurrences of clay of bentonitic type in the Prairie Provinces and several deposits are also known in British Columbia. The greater part of the small domestic production has come from deposits at Princeton, B.C. Production of bentonite has been expanding rapidly in the United States where a large proportion of the output is employed in the foundry industry as a core wash and to rejuvenate spent moulding sands; it is also used in emulsions of various types, asphalt and concrete, ceramic materials and a wide range of other products. Some bentonites on treatment with sulphuric acid acquire high bleaching power and in this form are extensively used in oil and gasoline refining, decolorizing animal and vegetable fats, etc."

The Canadian Government Purchasing Standards Committee tentatively approved in 1935 a specification for burned fireclay brick for stationary boiler service, details of which may be obtained from the Secretary, Canadian Purchasing Standards Committee, National Research Council, Ottawa.

The Canadian Engineering Standards Association circulated a questionnaire in 1933, the replies to which indicated an almost unanimous opinion in favour of adopting a standard size building brick and the majority opinion favoured the larger size recommended for all classes of building brick. It is believed that this represents the average size of the largest percentage of bricks now produced in the majority of plants throughout the country. This new standard (published April, 1935) covers common, rough face and smooth face brick and defines that such brick shall conform to the following dimensions: (approximate) length, 8 $\frac{3}{4}$; thickness, 2 $\frac{3}{8}$; width, 4 inches. More complete information relating to this standard, together with comment on tolerances, old stock, etc., is contained in the bulletin "Standard Dimensions for Building Brick" published by Canadian Engineers Standards Association, Ottawa. (Price, 25 cents.)

In this section all tables show data for the domestic clay products industry only.

Table 357†.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1934 and 1935

Industry and province	1934 Capital employed as represented by				
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$
By INDUSTRIES—					
*Brick and Tile—					
Nova Scotia.....	592,764	69,147	99,213	12,926	774,050
New Brunswick.....	178,785	3,164	24,162	17,870	223,981
Quebec.....	6,272,812	49,965	449,898	283,793	7,056,468
Ontario.....	9,323,926	138,660	861,885	1,158,644	11,483,115
Manitoba.....	123,301	947	23,625	42,256	190,129
Saskatchewan.....	221,448	1,563	28,872	59,985	311,868
Alberta.....	1,349,624	38,700	161,669	170,291	1,720,284
British Columbia.....	666,862	10,013	142,631	53,884	873,390
Total for Canada.....	18,729,522	312,159	1,791,955	1,799,649	22,633,285
Stoneware and pottery—					
Total for Canada.....	249,117	35,420	64,019	64,966	413,522
By PROVINCES—					
Total for clay and clay products—					
Nova Scotia.....	592,764	69,147	99,213	12,926	774,050
New Brunswick.....	188,574	5,507	29,761	31,357	255,199
Quebec.....	6,272,812	49,965	449,898	283,793	7,056,468
Ontario.....	9,378,186	145,560	872,225	1,193,309	11,589,280
Manitoba.....	123,301	947	23,625	42,256	190,129
Saskatchewan.....	221,448	1,563	28,872	59,985	311,868
Alberta.....	1,528,492	64,577	206,697	186,105	1,985,871
British Columbia.....	673,062	10,313	145,683	54,884	883,942
Canada.....	18,978,639	347,579	1,855,974	1,864,615	23,046,807

* Clay, sewer pipe, firebrick, firebrick products and other clays included under Brick and Tile.

† Excluding unmined material.

Table 357†.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1934 and 1935—Concluded

Industry and province	1935 Capital employed as represented by					Total
	Present cash value of land (excluding minerals)	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
BY INDUSTRIES—						
<i>*Brick and Tile—</i>						
Nova Scotia.....	123,366	473,332	71,308	104,321	36,275	808,602
New Brunswick.....	27,017	151,442	1,240	19,287	15,894	214,880
Quebec.....	566,992	3,440,028	50,110	1,129,735	338,862	5,525,727
Ontario.....	2,683,269	5,011,496	107,842	813,943	1,153,352	9,769,902
Manitoba.....	18,501	125,750	4,500	35,357	39,407	223,515
Saskatchewan.....	523,592	307,622	9,088	49,508	71,552	961,362
Alberta.....	142,921	1,194,365	26,148	152,992	170,737	1,687,163
British Columbia.....	160,273	575,650	10,206	138,208	68,943	953,250
Total for Canada.....	4,245,931	11,279,685	280,442	2,443,351	1,895,022	20,144,431
<i>Stoneware and pottery—</i>						
Total for Canada.....	40,778	178,759	26,756	51,866	59,416	357,575
BY PROVINCES—						
<i>Total for clay and clay products—</i>						
Nova Scotia.....	123,366	473,332	71,308	104,321	36,275	808,602
New Brunswick.....	28,017	159,914	3,515	27,016	28,688	247,150
Quebec.....	566,992	3,440,028	50,110	1,129,735	338,862	5,525,727
Ontario.....	2,698,260	5,031,496	108,742	820,127	1,179,502	9,838,136
Manitoba.....	18,501	125,750	4,500	35,357	39,407	223,515
Saskatchewan.....	523,592	307,622	9,088	49,508	71,552	961,362
Alberta.....	167,699	1,344,652	49,729	190,945	191,209	1,944,234
British Columbia.....	160,273	575,650	10,206	138,208	68,943	953,250
Canada.....	4,286,709	11,458,444	307,198	2,495,217	1,954,438	20,502,006

* Clay, sewer pipe, firebrick, firebrick products and other clays included under Brick and Tile.

† Excluding unmined material.

Table 358.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1934 and 1935

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1934						
Nova Scotia.....	9	83	92	18,714	49,280	67,994
New Brunswick.....	8	45	53	9,402	23,644	33,046
Quebec.....	47	305	352	93,235	193,701	286,936
Ontario.....	102	629	731	177,561	410,187	587,748
Manitoba.....	5	2	7	9,800	177	9,977
Saskatchewan.....	8	26	34	15,324	19,497	34,821
Alberta.....	20	147	167	41,536	100,587	142,123
British Columbia.....	16	120	136	24,150	76,182	100,332
Canada.....	215	1,357	1,572	389,722	873,255	1,262,977
1935						
Nova Scotia.....	9	101	110	20,734	78,187	98,921
New Brunswick.....	8	39	47	8,686	21,831	30,517
Quebec.....	54	296	350	86,404	182,370	268,774
Ontario.....	99	650	749	162,566	431,203	593,769
Manitoba.....	6	64	70	10,500	40,134	50,634
Saskatchewan.....	10	34	44	16,603	22,330	38,933
Alberta.....	24	174	198	45,861	129,063	174,924
British Columbia.....	16	144	160	23,600	107,852	131,452
Canada.....	226	1,502	1,728	374,954	1,012,970	1,387,924

* See note page 26.

Table 359.—Number of Wage-Earners in the Clay Products Industry by Months, 1933-1935

Month	1933	1934	1935
January.....	644	773	657
February.....	554	792	571
March.....	576	734	638
April.....	669	980	1,126
May.....	980	1,639	1,759
June.....	1,274	1,978	2,193
July.....	1,571	1,991	2,320
August.....	1,611	2,038	2,324
September.....	1,604	1,713	1,950
October.....	1,242	1,463	1,755
November.....	1,083	1,038	1,366
December.....	780	833	1,048

Table 360.—Production of Clay Products in Canada from Domestic Clays, by Provinces, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Prince Edward Island	Nova Scotia	New Brun- swick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Canada
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1926.....		362,667	75,851	2,702,298	5,356,469	248,497	214,113	804,933	592,495	10,357,323
1927.....		416,417	87,185	2,734,738	5,853,035	201,464	311,204	889,358	679,788	11,173,189
1928.....		496,577	72,192	3,097,295	6,177,664	291,791	377,896	1,162,264	706,039	12,381,718
1929.....		653,157	160,006	3,187,702	6,530,162	362,240	502,522	1,342,427	866,427	13,904,643
1930.....		495,333	162,536	2,464,044	5,221,214	215,967	349,253	997,665	687,516	10,593,578
1931.....		467,126	143,348	2,360,908	3,552,800	122,628	166,257	529,716	498,505	7,841,288
1932.....		172,557	68,151	1,064,551	1,639,508	49,773	109,739	329,584	216,355	3,650,218
1933.....		125,500	46,917	580,088	1,024,579	20,966	92,207	198,373	174,208	2,262,835
1934.....		157,158	59,897	632,322	1,261,006	37,916	90,997	246,677	194,437	2,680,410
1935.....		270,478	62,478	593,162	1,370,225	74,755	98,150	326,679	216,636	3,012,563

Table 361.—Production in Canada, of Clay and Clay Products, 1933-1935

Kind	1933		1934		1935	
	Quantity	Total selling value	Quantity	Total selling value	Quantity	Total selling value
		\$		\$		\$
PRODUCTION—						
Brick: Soft mud process (Face..... M	2,482	41,737	4,904	76,247	6,695	122,215
(Common.... M	12,389	156,769	14,256	183,585	21,197	259,504
Stiff mud process (Face..... M	19,602	412,367	23,800	494,341	25,289	500,066
(wire cut) (Common.... M	23,894	356,498	30,317	424,131	32,334	437,123
Dry press (Face..... M	4,544	101,252	6,005	130,392	8,454	175,042
(Common..... M	3,916	44,377	6,440	66,616	6,381	55,253
Fancy or ornamental brick (in- cluding special shapes, em- bossed and enamelled brick) M	630	7,824	43	2,625	13	728
Sewer brick..... M	243	3,693	307	5,992	175	5,236
Paving brick..... M	1	42	10	382	15	627
Firebrick from domestic clay.. M	1,547	73,226	2,109	101,219	1,817	90,149
Fireclay..... tons	1,421	11,273	1,043	12,598	2,272	15,574
Kaolin..... tons			48	504	170	1,520
Bentonite..... tons	55	1,363	63	1,578	41	781
Fireclay blocks and shapes.....		80,625		62,388		71,344
Structural tile—						
Hollow blocks (including fireproofing and load-bearing tile)..... tons	26,747	160,059	31,136	244,122	47,195	344,608
Roofing tile..... No.	20,469	1,136	44,115	1,852	82,015	3,669
Floor tile (quarries)..... sq. ft.	91,495	14,297	80,356	17,491	51,765	7,629
Ceramic or glazed floor and wall tile.....						615
Drain tile..... M	10,057	222,829	7,325	180,553	7,124	205,336
Sewer pipe (including copings, flue lin- ings, etc.).....		354,458		436,433		481,559
Pottery, glazed or unglazed.....		202,500		223,733		220,711
Other clay products.....		16,510		13,628		13,274
Total.....		2,262,835		2,680,410		3,012,563

Table 362.—Production of Building Brick in Canada, by Provinces, 1933-1935

		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1933									
Soft mud process	Face.....	M 60			2,292		11		119
		\$ 900			38,360		333		2,144
	Common.....	M 480	678	1,241	6,796	1,091	23		2,080
		\$ 5,680	9,992	9,862	87,644	16,035	369		27,187
Stiff mud process (wire cut)	Face.....	M 422	118	7,234	11,660	70	17	64	17
		\$ 10,233	3,676	153,990	240,738	1,683	624	1,078	345
	Common.....	M 1,671	411	17,483	3,191		62	711	365
		\$ 20,046	6,972	270,483	46,337		641	6,542	5,477
Dry press	Face.....	M		601	3,302		8	476	157
		\$		18,166	72,194		185	4,557	6,150
	Common.....	M			1,834			2,082	
		\$			29,357			15,020	
Fancy or ornamental brick.....	M				6			624	
	\$				387			7,437	
Sewer brick.....	M				242				1
	\$				3,683				10
Total.....	M	2,633	1,207	26,559	29,323	1,161	121	3,957	2,739
	\$	36,859	20,640	452,501	518,790	17,718	2,152	34,634	41,313
1934									
Soft mud process	Face.....	M 40		1,000	3,514	350			
		\$ 600		7,000	64,642	4,005			
	Common.....	M 500	1,500	1,580	7,193	1,634	20	763	1,066
		\$ 5,000	19,399	13,349	96,776	25,334	325	9,178	14,224
Stiff mud process (wire cut)	Face.....	M 545	267	7,637	15,060	160	12	87	32
		\$ 11,863	6,846	157,078	311,490	4,224	382	1,601	857
	Common.....	M 2,695	141	18,404	6,876		173	829	1,199
		\$ 32,924	2,239	267,622	97,323		1,936	6,189	15,898
Dry press	Face.....	M		610	4,836		47	374	138
		\$		15,951	108,718		1,290	3,857	5,576
	Common.....	M			2,046		13	3,828	553
		\$			33,177		243	26,937	6,259
Fancy or ornamental brick.....	M				14			29	
	\$				835			1,790	
Sewer brick.....	M				307				
	\$				5,992				
Total.....	M	3,780	1,908	29,231	39,846	2,144	265	5,910	2,988
	\$	50,387	28,484	461,000	713,953	33,563	4,176	49,552	42,814
1935									
Soft mud process	Face.....	M 50		225	5,553	600	51	216	
		\$ 700		2,025	104,271	8,571	1,248	5,400	
	Common.....	M 450	1,202	1,782	10,026	2,971	163	3,087	1,516
		\$ 5,000	20,101	12,570	128,205	42,635	2,143	29,643	19,207
Stiff mud process (wire cut)	Face.....	M 735	104	6,909	16,558	192	37	168	586
		\$ 17,313	2,777	136,975	321,581	5,001	1,076	1,545	13,798
	Common.....	M 3,050	383	18,044	9,170		169	646	872
		\$ 38,208	4,840	252,014	125,559		1,766	3,311	11,425
Dry press	Face.....	M		1,424	5,953		45	838	194
		\$		35,559	119,379		1,093	11,881	7,130
	Common.....	M			1,563		12	4,806	
		\$			22,071		203	32,979	
Fancy or ornamental brick.....	M				13				
	\$				728				
Sewer brick.....	M				60				115
	\$				970				4,266
Total.....	M	4,285	1,689	28,384	48,896	3,763	477	9,761	3,233
	\$	61,221	27,718	439,143	822,764	56,207	7,529	84,759	55,826

Table 363.—Production of Building Brick in Canada, 1926-1935

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or orna- mental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1926	M	28,235	78,158	101,028	94,046	30,423	19,450	462	6,546	358,348
	\$	556,573	1,145,490	2,146,362	1,624,055	651,236	260,598	24,057	117,194	6,525,565
1927	M	16,196	70,554	95,480	150,222	39,753	14,617	620	10,997	398,439
	\$	325,966	1,091,274	2,024,064	2,239,180	833,570	187,062	29,372	210,643	6,941,131
1928	M	17,532	93,280	101,717	144,404	36,587	24,294	599	2,888	421,301
	\$	349,847	1,328,981	2,247,472	2,182,307	748,301	337,096	28,763	59,010	7,281,777
1929	M	26,624	77,399	114,093	170,840	38,591	26,131	187	4,765	458,630
	\$	538,096	1,195,611	2,469,417	2,509,451	813,461	368,039	12,795	96,588	8,003,358
1930	M	247,220	861,805	2,135,871	1,480,965	604,197	16,915	27,649	15,299	5,581,501
	\$	5,476	41,177	77,135	81,930	20,149	8,688	335	2,553	237,143
1931	M	116,316	619,357	1,752,947	1,205,464	423,357	107,213	20,773	43,692	4,289,119
	\$	6,188	12,801	30,197	40,753	5,522	4,248	125	643	100,477
1932	M	108,582	182,372	664,756	638,922	119,547	46,762	6,237	12,156	1,779,334
	\$	2,482	12,389	19,602	23,894	4,544	3,916	630	243	67,700
1933	M	41,737	156,769	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517
	\$	4,904	14,255	23,800	30,317	6,005	6,440	43	307	86,072
1934	M	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,992	1,383,929
	\$	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,538
1935	M	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167

Table 364.—Production of Paving Brick in Canada, 1923-1935

(For years 1897 to 1922 see previous reports)

Year	Quantity	Value
	M	\$
1923-25		
1926	122	5,015
1927	50	2,106
1928	338	4,404
1929	97	3,844
1930	9	297
1931	19	682
1932	6	155
1933	1	42
1934	10	382
1935	15	627

Table 365.—Production of Structural Tile in Canada, by Provinces, 1933-1935

Province	Hollow blocks (including fireproofing and load-bearing tile)		Roofing tile		Floor tile (quarries)	
	Tons	Value	No.	Value	Sq. ft.	Value
1933		\$		\$		\$
Nova Scotia	1,759	17,590				
New Brunswick	65	631				
Quebec	7,676	66,197				
Ontario	8,196	60,438	20,469	1,136	81,808	12,490
Manitoba	44	532				
Saskatchewan	201	2,210				
Alberta	628	5,632			9,687	1,807
British Columbia	8,178	6,824				
Canada	26,747	160,059	20,469	1,136	91,495	14,297
1934						
Nova Scotia	1,068	10,955				
New Brunswick	151	1,276				
Quebec	13,668	107,675				
Ontario	13,576	102,243	44,115	1,852	77,604	16,886
Manitoba	158	1,941				
Saskatchewan	4	45				
Alberta	1,436	10,438			2,752	605
British Columbia	1,075	9,549				
Canada	31,136	244,122	44,115	1,852	80,356	17,491
1935						
Nova Scotia	3,558	23,914				
New Brunswick	410	3,640				
Quebec	11,894	87,155				
Ontario	22,983	156,702	82,015	3,669	48,923	7,142
Manitoba	1,698	15,002				
Saskatchewan	1,098	9,109				
Alberta	3,900	34,493			1,567	314
British Columbia	1,654	14,593			1,275	173
Canada	47,195	344,608	82,015	3,669	51,765	7,629

Table 366.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1926-1935

(For the years 1888 to 1925 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	75,996	1,480,776	1931.....		1,508,803
1927.....	77,262	1,475,875	1932.....		813,224
1928.....		1,723,644	1933.....		354,458
1929.....		2,005,887	1934.....		436,433
1930.....		1,721,815	1935.....		481,559

Table 367.—Production of Drain Tile in Canada, 1926-1935

(For the years 1891 to 1925 see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1926.....	14,258	396,018	1931.....	12,518	328,410
1927.....	22,259	598,098	1932.....	7,385	186,670
1928.....	22,629	656,054	1933.....	10,057	222,820
1929.....	25,000	720,316	1934.....	7,325	180,553
1930.....	25,291	687,070	1935.....	7,124	205,336

Table 368.—Production of Drain Tile and Sewer Pipe, in Canada, by Provinces, 1934 and 1935

Province	1934				1935			
	Drain tile		†Sewer pipe		Drain tile		†Sewer pipe	
	M	\$	Tons	\$	M	\$	Tons	\$
Nova Scotia.....	96	3,179		91,724	729	33,539		146,962
New Brunswick.....	5	142			4	160		
Quebec.....	540	14,191		48,952	540	15,895		49,449
Ontario.....	6,017	137,699		226,005	5,061	125,593		196,647
Manitoba.....	41	2,412			69	3,546		
Saskatchewan.....	48	2,144		47,763	52	2,176		63,600
Alberta.....	580	20,786		21,989	669	24,427		24,901
British Columbia.....								
Canada.....	7,325	180,553		436,433	7,124	205,336		481,559

† Includes copings, flue linings, etc.

Table 369.—Production of Pottery from Domestic Clays in Canada, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Value	Year	Value
	\$		\$
1926.....	320,135	1931.....	257,125
1927.....	307,057	1932.....	244,861
1928.....	356,093	1933.....	202,500
1929.....	323,194	1934.....	223,733
1930.....	294,866	1935.....	220,711

Table 370.—Production of Kaolin and Fireclay in Canada, 1926-1935

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1926.....			2,513	23,258	1931.....			1,233	14,857
1927.....	24	120	5,070	35,961	1932.....			990	11,826
1928.....	5	25	5,123	35,284	1933.....			1,421	11,273
1929.....			5,041	35,226	1934.....	48	504	1,043	12,598
1930.....			2,870	25,975	1935.....	170	1,520	2,272	15,574

Table 371.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1926-1935

(For the years 1907 to 1925 see Mineral Production of Canada, 1928)

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1926.....	4,195	192,276	54,064	1931.....	2,248	107,597	83,039
1927.....	5,388	246,266	100,659	1932.....	1,580	71,757	75,209
1928.....	4,910	234,460	105,091	1933.....	1,547	73,226	80,625
1929.....	5,196	251,043	130,411	1934.....	2,109	101,219	62,388
1930.....	3,789	177,608	147,309	1935.....	1,817	90,149	71,344

Table 372.—Production of Refractories, in Canada, from Domestic Clays, by Provinces, 1934 and 1935

Province	1934					1935				
	Fireclay		Firebrick		Fire-clay blocks and shapes	Fireclay		Firebrick		Fire-clay blocks and shapes
	Quantity	Value	Quantity	Value	Value	Quantity	Value	Quantity	Value	Value
	Tons	\$	M	\$	\$	Tons	\$	M	\$	\$
Nova Scotia.....	24	230			367	1,065	3,541			488
New Brunswick.....	15	601								1,956
Ontario.....										
Saskatchewan.....	441	3,322	558	28,537	52,276	670	4,683	272	18,114	57,055
Alberta.....	50	708	13	882		14	213	51	2,476	
British Columbia.....	513	7,737	1,538	71,800	9,745	523	7,137	1,494	69,559	11,845
Canada.....	1,043	12,598	2,109	101,219	62,388	2,272	15,574	1,817	90,149	71,344

Table 373.—Fullers' Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1931-1935

Year	Petroleum products industry		Soaps and washing compounds	
	Pounds (*)	Value	Pounds	Value
		\$		\$
1931.....	16,157,582	201,361	492,174	6,264
1932.....	19,642,179	258,934	507,807	7,444
1933.....	22,811,655	314,515	588,434	8,501
1934.....	18,588,514	239,357	508,316	6,562
1935.....	18,487,148	260,885	660,018	13,694

(*) Includes all clay.

Table 374.—Clay Used in the Manufacture of Paper in Canada, 1931-1935

Year	Tons	Value
		\$
1931.....	11,484	173,660
1932.....	14,432	205,068
1933.....	20,048	267,014
1934.....	27,550	357,286
1935.....	33,766	442,584

Table 375.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and their Products in Canada, 1931-1935

Year	Firebrick		Fireclay		Other fireclay, firebrick and cupola blocks
	No.	Value	No.	Value	
		\$		\$	\$
1931.....	4,326,000	197,684	7,631	64,300	63,935
1932.....	3,409,000	123,532	5,910	52,492	38,970
1933.....	1,846,016	141,784	7,615	62,602	11,628
1934.....	2,590,452	192,538	8,248	75,906	21,488
1935.....	(a)	451,604	11,510	101,601	28,004

(a) Information not available.

Table 376.—Clays and Earths Used in Canadian Rubber Industry, 1933-1935

Year	Tons	Value
		\$
1933.....	1,391	32,361
1934.....	2,391	54,368
1935.....	2,640	63,553

Table 377.—Imported Fire and Other Clays Used in the Imported-Clay Products Industry (*) 1931-1935

Year	Fire clay		Other clay	
	Tons	\$	Tons	\$
1931.....	22,075	145,856	7,137	144,914
1932.....	14,961	83,865	5,517	103,204
1933.....	11,834	74,530	4,367	82,890
1934.....	16,556	113,277	8,069	132,916
1935.....	11,475	66,698	14,907	129,484

(*) Manufacture firebrick, cements, sanitary earthenware, porcelain insulators, floor and wall tile, pottery, etc.

Table 378.—Imports into Canada and Exports of Clay and Clay Products, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Building brick..... ton	1,514	16,673	570	8,519
Building blocks.....		1,794		3,209
Clays—China..... cwt.	654,999	250,705	708,890	287,997
Fire..... cwt.	909,972	139,317	993,947	156,361
Pipe.....		44		6,489
Other clays, n.o.p.....		196,327		258,044
Zirconium silicate.....		2,029		2,307
Zirconium oxide.....		7,827		13,824
Drain tile, unglazed.....		251		11
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed.....		9,799		8,219
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....		39,778		28,890
Tiles, earthenware, for roofing purposes.....		2,172		5,146
Tiles, earthenware, n.o.p.....		92,835		97,779
Insulators, electric, porcelain.....		62,510		63,428
Pottery and chinaware.....		3,054,124		3,363,970
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches for use exclusively in the construction or repair of a furnace, kiln, etc.....		85,788		110,863
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln, or other equipment of a manufacturing establishment.....		667,471		492,961
Firebrick, n.o.p.....		47,517		224,735
Firebrick, chrome.....		39,184		46,882
Magnetite brick.....		396,915		384,141
Silica brick (containing not less than 90 per cent silica).....		210,190		215,600
Paving brick..... ton	1,775	12,035	2,505	18,787
Artificial teeth, not mounted.....		276,594		306,922
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p.....		115,355		85,350
Ceramic insulator cores, not further manufactured than burned and glazed, printed or decorated or not, and without fittings, when imported by manufacturers of spark plugs for use exclusively in the manufacture of spark plugs, in their own factories.....		109,915		130,069
Crucibles, clay or sand.....		42,142		44,586
Other manufactures of clay.....		56,514		73,053
Total.....		5,935,805		6,438,042
EXPORTS—				
Building brick..... M	549	10,287	367	6,784
Clay—Unmanufactured..... cwt.	7,619	1,668	5,591	2,595
Manufactures.....		14,900		15,502
Earthenware.....		33,762		49,843
Porcelain insulators.....		125,742		288,440
Total.....		186,359		363,164

Table 379.—World's Production of China Clay, 1933-1935

(Taken from the Imperial Institute's publication "The Mineral Industry of the British Empire and Foreign Countries, 1933-1935")
(Long tons)

Producing country and description	1933	1934	1935
BRITISH EMPIRE			
United Kingdom.....	596,609	690,129	707,572
Union of South Africa.....		369	226
Canada.....		43	152
Federated Malay States.....	153	164	91
India.....	21,935	20,562	14,435
Unfederated Malay States.....	36	143	5
Australia.....	8,477	12,078	14,661
FOREIGN COUNTRIES			
Austria.....	(a)	13,572	19,400
Belgium (e).....	13,651	14,291	15,363
Bulgaria.....	2,617	6,181	5,271
Czechoslovakia (estimated).....	350,000	350,000	350,000
Denmark—Crude.....	34,300	42,400	34,900
Washed and pressed.....	8,600	11,200	9,800
Dried.....	700	700	
France.....	109,800	134,100	(a)
Germany—			
Bavaria.....	467,455	677,287	657,205
Prussia.....	11,961	61,793	68,074
Saxony—Crude.....	42,002	35,940	47,622
Washed.....	32,904	43,054	44,101
Sand.....	(a)	10,114	(a)
Italy—Crude.....	20,873	37,232	69,600
Washed and ground (c).....	4,009	(a)	5,000
Kaolinic earth.....	1,600	(a)	1,500
Portugal.....	9,416	11,644	13,576
Roumania (d).....	10,212	14,546	(a)
Spain (g).....	1,545	1,348	(a)
Sweden.....	1,878	2,337	(a)
Algeria.....	2,042	1,523	1,253
United States (f).....	367,172	380,656	467,487
Argentina.....		45	604
Chile.....	9,260	7,009	(a)
China (b).....	784,060	792,000	(a)
Japan (estimated).....	400,000	400,000	400,000
Korea.....	24,536	23,051	32,874
"Manchoukuo".....	144,747	160,000	(a)
Netherlands East Indies.....	229		12

China clay is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) Includes fireclay.

(c) Derived from crude and stocks.

(d) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(e) "Eurite" and kaolin.

(f) Sales of china clay and paper clay.

(g) 4,540 cubic metres of kaolinic sand were also produced in quarries during 1934.

(2) Products from Imported Clays

A number of factories in Canada manufacture ceramic products from clays which they import chiefly from England and the United States. Firebrick, refractory cements, sanitary earthenware, porcelain insulators, floor and wall tile, pottery, tableware and sewer pipe were the principal products made in these works.

In 1935 there were 20 factories in operation in this industry as compared with 19 in 1934 and output advanced 13 per cent in value to \$2,174,977 from \$1,923,218 in the previous year. Capital employed amounted to \$4,449,314 and the average number of workers was 895. Salaries and wages amounted to \$864,212, materials for manufacturing cost \$530,735 and fuel and electricity cost \$187,180.

Table 380.—Products Made in the Imported-Clay Products Industry*, 1934 and 1935

Products	1934	1935
	Selling value at works	Selling value at works
Firebrick and stove linings—Rigid.....	\$ 266,809	\$ 291,059
Plastic.....	47,936	43,256
Porcelain insulators, sanitary ware, sewer pipe, floor and wall tile, tanks, pottery, etc.....	1,608,473	1,840,662
Total.....	1,923,218	2,174,977

* This industry is confined to Ontario and Quebec.

LIME

Sales of lime in 1935 by Canadian producers, including both quick and hydrated, and inclusive of lime used by producers, amounted to 405,419 short tons valued at \$2,925,791 as compared with 368,113 short tons worth \$2,745,797 in 1934. The 1935 output represents an increase of 10.1 per cent in quantity and 6.5 per cent in value over that of the preceding year. Lime production in Canada has shown an upward trend in both tonnage and value since 1932 and the output in 1935 was the greatest since 1930 in which year 490,802 tons worth \$4,038,698 was recorded.

Lime was produced during 1935 in every province with the exception of Prince Edward Island and Saskatchewan; Ontario and Quebec are the two largest producers, the tonnage of their shipments being 54.3 per cent and 28.7 per cent, respectively, of the Dominion total in 1935.

Industries consuming lime as a chemical absorbed 260,885 tons valued at \$1,775,657 in 1935 while a tonnage of 144,534 worth \$1,150,134 was utilized for building and other non-chemical purposes; of the latter tonnage 80,250 tons valued at \$595,730 was recorded for agricultural purposes.

Of the total lime produced in 1935 quicklime comprised 342,047 short tons and hydrated, 63,372 short tons. A comparison of production with that of the preceding year reveals a 10.0 per cent increase in the tonnage of quicklime and a 5.6 per cent increase in that for the hydrated variety. The combined tonnage of both kinds of lime shipped for chemical purposes comprised 64.3 per cent of the total 1935 lime output; increased consumption as a chemical was particularly pronounced in the shipments to gold mines and pulp and paper plants and the increases recorded for these and various other lime consuming industries reflects the almost general improvement in industrial conditions throughout the country.

Canadian producers received an average of \$7.09 per ton for quicklime and \$7.90 for hydrated lime in 1935 as compared with \$7.26 and \$8.46, respectively, in the preceding year.

During 1935 the 49 firms comprising the Canadian lime industry provided employment for 756 persons and distributed \$556,049 in salaries and wages. The industry consumed \$810,437 in fuel, electricity and process supplies and of this total \$431,541 represented expenditures for coal; \$69,224 for coke and \$120,236 for wood.

A report recently issued by the Mines Branch, Department of Mines and Resources, Ottawa, contains the following information. "The placing of pulverized quicklime on the market by a number of Canadian lime companies is a development worthy of note. This product finds a market in the chemical and metallurgical industries and it also competes with hydrated lime for plastering purposes on account of the fact that on being slaked it yields a highly plastic putty that does not require more ageing than does putty made from hydrated lime. Sales have increased rapidly, particularly in Western Canada where highly plastic hydrated lime is not cheaply available. Producers report that pulverized lime packed in air-tight bags will keep for 4 to 6 months without air-slaking, as against 2 to 3 weeks for lump lime; during 1935 a Canadian company began the manufacture of waterproof lime, which is a pulverized quicklime to which certain waterproofing ingredients have been added. Localities where lime may be produced in the future are numerous because of the abundance of suitable limestone in most parts of Canada."

Imports of lime into Canada during 1935 totalled 12,706 cwt. valued at \$9,181 as compared with 6,543 cwt. worth \$5,118 in 1934. Exports of lime in 1935 amounted to 104,598 cwt. valued at \$50,296 as against 213,491 cwt. at \$151,983 in the preceding year.

Table 381.—Capital Employed in the Lime Industry in Canada, by Provinces, 1934 and 1935

Province	1934				
	Capital employed as represented by				
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$
New Brunswick*	159,000	72,000	8,750	25,180	265,930
Quebec	1,802,400	101,484	14,961	180,179	1,951,014
Ontario	1,150,580	100,897	4,500	82,705	3,339,551
Manitoba	2,170,760	48,790	44,865	8,000	2,263,215
Alberta	134,180	5,140	2,140	20,005	195,585
British Columbia	327,774	35,000	28,225	142,845	581,855
Canada	7,649,456	390,507	106,165	444,927	8,497,985

* Includes data for 2 firms in Nova Scotia.

Province	1935				
	Capital employed as represented by				
	Present value of land, buildings, fixtures, machinery, tools and other equipment	Inventory value of goods on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	\$	\$	\$	\$	\$
New Brunswick*	58,700	97,900	13,410	8,571	187,381
Quebec	862,899	717,159	54,774	58,385	1,688,465
Ontario	475,215	1,727,680	177,540	7,815	2,392,165
Manitoba	552,207	14,848	4,255	8,000	614,880
Alberta	25,000	158,420	4,353	4,508	199,320
British Columbia	7,430	383,945	87,327	215,669	625,440
Canada	1,299,684	3,647,558	241,532	303,893	5,797,391

* Includes data for 2 firms in Nova Scotia.

Table 382.—Employees, Salaries and Wages in the Lime Industry in Canada, by Provinces, 1934 and 1935

Province	* Average number of employees			Salaries and wages		
	Salaries employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1934						
New Brunswick†	9	30	75	11,068	52,105	63,173
Quebec	21	251	272	25,865	148,559	173,725
Ontario	17	198	215	25,329	142,918	166,297
Manitoba	3	65	68	8,780	31,061	39,341
Alberta	5	17	20	4,800	18,485	20,065
British Columbia	10	77	87	8,990	42,401	51,391
Canada	62	673	735	82,983	432,509	535,492
1935						
New Brunswick†	9	30	98	11,939	68,636	82,375
Quebec	10	204	217	24,173	118,734	172,107
Ontario	18	201	219	26,801	154,341	181,342
Manitoba	6	69	75	8,023	49,006	57,629
Alberta	4	10	20	4,800	18,370	23,070
British Columbia	8	68	67	7,503	31,760	39,070
Canada	61	693	736	84,741	471,508	556,049

* See note page 20.

† Includes data for 2 firms in Nova Scotia.

Table 383.—Number of Wage-Earners on Pay-Roll or Time Record on the 15th of Each Month or Nearest Representative Date, 1933-1935

Month	1933		1934		1935	
	Quarry	Kiln	Quarry	Kiln	Quarry	Kiln
January.....	202	274	247	337	187	351
February.....	185	247	259	339	186	337
March.....	209	265	252	332	221	363
April.....	218	326	259	360	240	391
May.....	305	367	337	442	292	447
June.....	337	380	337	440	284	453
July.....	361	408	311	425	298	476
August.....	350	375	279	390	303	428
September.....	339	366	311	399	302	455
October.....	323	390	330	418	323	494
November.....	288	350	263	396	264	476
December.....	273	308	233	341	224	432

Table 384.—Production of Lime in Canada, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	413,901	3,781,484	1931.....	344,785	2,764,415
1927.....	444,753	3,923,388	1932.....	320,650	2,394,537
1928.....	508,889	4,534,568	1933.....	323,540	2,432,306
1929.....	674,087	5,908,610	1934.....	368,113	2,745,797
1930.....	490,802	4,038,698	1935.....	405,419	2,925,791

Table 385.—Production of Lime in Canada, by Provinces, 1933-1935

Province		Quicklime		Hydrated lime		Total	
		Sold or used		Sold or used		Sold or used	
		Tons	Value	Tons	Value	Tons	Value
			\$		\$		\$
Nova Scotia.....	1933	3,325	24,270	589	5,890	3,914	30,160
	1934	8,298	63,630	622	4,324	8,920	67,954
	1935	10,998	80,408	333	2,290	11,331	82,698
New Brunswick.....	1933	8,059	68,446	8,790	66,340	16,849	134,786
	1934	8,949	76,132	6,803	50,277	15,752	126,409
	1935	9,569	74,721	6,703	50,054	16,272	124,775
Quebec.....	1933	89,740	539,603	20,594	107,955	110,334	647,558
	1934	85,106	510,614	23,584	121,370	108,690	631,984
	1935	91,086	545,956	25,387	132,910	116,473	678,866
Ontario.....	1933	126,460	1,006,906	19,733	220,291	146,193	1,227,197
	1934	168,760	1,287,251	22,281	249,038	191,041	1,536,289
	1935	196,761	1,470,721	23,379	226,146	220,140	1,696,867
Manitoba.....	1933	14,793	110,957	3,239	56,683	18,032	167,640
	1934	12,988	100,958	3,580	62,650	16,568	163,608
	1935	14,594	115,149	4,021	70,368	18,615	185,517
Alberta.....	1933	7,403	61,061	98	976	7,501	62,037
	1934	7,300	64,143	155	1,554	7,455	65,697
	1935	6,354	54,803	230	2,305	6,584	57,108
British Columbia.....	1933	18,147	144,479	2,570	18,449	20,717	162,928
	1934	16,721	135,528	2,966	18,328	19,687	153,856
	1935	12,685	83,664	3,319	16,296	16,004	99,960
Canada.....	1933	267,927	1,955,722	55,613	476,584	323,540	2,432,306
	1934	308,122	2,238,256	59,991	507,541	368,113	2,745,797
	1935	342,047	2,425,422	63,372	500,369	405,419	2,925,791

Table 386.—Production of Lime in Canada, by Provinces, 1935, Showing Purposes for which Used or Sold

		Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Canada
QUICKLIME							
Building trades—							
Finishing lime.....ton		94		246	1,100		1,440
	\$	1,011		2,328	9,499		12,838
Masons' lime.....ton		650	3,463	8,760	2,091		14,964
	\$	6,000	32,147	53,123	23,084		114,354
Sand-lime brick.....ton			162	5,214			5,376
	\$		847	32,641			33,488
Agriculture.....ton		700		76,001			76,701
	\$	4,067		568,201			572,268
Chemical—							
Smelters.....ton			1,374	4,725	813	755	7,667
	\$		13,058	25,420	8,133	3,752	50,363
Iron and steel mills.....ton			114	8,214			19,326
	\$		80,408	59,409			140,849
Cyanide mills.....ton				24,687	4,849	621	30,157
	\$			177,187	42,871	6,454	226,512
Pulp and paper mills.....ton			6,026	3,826	7,375	7,069	77,898
	\$		46,355	21,399	47,394	52,385	450,700
Glass works.....ton				5,003	88		5,091
	\$			34,558	834		35,392
Sugar refineries.....ton			200	7,072	4,175		11,537
	\$		1,700	57,441	33,400		93,441
Fertilizers.....ton				17			17
	\$			119			119
Tanneries.....ton			51	2,343			2,394
	\$			15,899			16,409
Insecticides.....ton				583			583
	\$			4,083			4,083
Other chemical works.....ton			26,961	47,837	129		74,927
	\$		175,239	402,348	1,063		578,650
Dealers—Uses unspecified.....ton			1,899	2,110	328	4,240	12,346
	\$		15,588	15,560	3,674	21,073	84,451
Other consumers.....ton			1,500	123			1,623
	\$		10,500	1,005			11,505
Total quicklime.....ton		20,567	91,086	196,761	20,948	12,685	342,047
	\$	155,129	545,956	1,470,721	169,952	83,664	2,425,422
HYDRATED LIME							
Building trades—							
Finishing lime.....ton		40		15,002	4,118		19,160
	\$	440		160,553	70,345		231,338
Masons' lime.....ton		250	108	5,628			5,986
	\$	2,350	815	40,090			43,255
Sand-lime brick.....ton							
	\$						
Agriculture.....ton		650	917	475		1,507	3,549
	\$	6,000	5,536	4,527		7,399	23,462
Chemical—							
Smelters.....ton				75		530	605
	\$			694		2,602	3,296
Iron and steel mills.....ton				23			23
	\$			216			216
Cyanide mills.....ton			2,633	3		15	2,651
	\$		15,797	28		74	15,899
Pulp and paper mills.....ton			5,600	668		157	24,877
	\$		40,000	6,010		771	133,371
Glass works.....ton							
	\$						
Sugar refineries.....ton		10	355				365
	\$	90	2,255				2,345
Tanneries.....ton			258	180			438
	\$		1,954	1,618			3,572
Fertilizers.....ton			295	118			413
	\$		2,170	1,091			3,261
Insecticides.....ton			283	173			456
	\$		1,840	1,600			3,440
Other chemical works.....ton			553	774	133		1,460
	\$		4,253	7,158	2,328		13,739
Dealers—Uses unspecified.....ton			1,814	141		1,110	3,268
	\$		1,624	1,371		5,450	21,970
Other consumers.....ton			2	119			121
	\$		15	1,190			1,205
Total hydrated lime.....ton		7,036	25,387	23,379	4,251	3,319	63,372
	\$	52,344	132,910	226,146	72,673	16,296	500,369
Grand total.....ton		27,603	116,473	220,140	25,199	16,004	405,419
	\$	207,473	678,866	1,696,867	242,625	99,960	2,925,791

Table 387.—Lime Sold or Used for Chemical and Other Purposes and Value of Contracts Awarded in Canada, 1931-1935

Year	Lime sold or used for chemical purposes		Lime sold or used for building or other non-chemical purposes		Value of construction contracts awarded in Canada (a)
	Tons	Value	Tons	Value	Value
		\$		\$	\$
1931.....	231,837	1,637,319	112,948	1,127,096	315,482,000
1932.....	255,472	1,758,898	65,178	635,639	132,872,400
1933.....	235,810	1,684,946	87,730	767,360	97,289,800
1934.....	229,906	1,598,906	138,207	1,146,891	125,811,500
1935.....	260,885	1,775,657	144,534	1,150,134	160,305,000

(a) Compiled by McLean Building Reports Ltd.

Table 388.—Imports into Canada and Exports of Lime and Various Lime Compounds, 1934 and 1935

	1934		1935	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Lime.....Cwt.	6,543	5,118	12,706	9,181
Calcium chloride in packages of not less than 25 pounds.....lb.	6,634,500	66,957	924,700	8,163
Calcium chloride in packages of less than 25 pounds.....lb.	460	107	652	175
Calcium chloride not in solution for road treating purposes.....lb.	44,940,900	480,623	28,019,000	268,410
Calcium arsenate.....lb.	165,077	9,123	144,023	7,786
Chloride of lime and hypochlorite of lime in packages of not less than 25 pounds.....lb.	4,585,300	75,500	3,413,900	61,371
Chloride of lime and hypochlorite of lime in packages of less than 25 pounds.....lb.	57,293	6,048	47,229	5,781
EXPORTS—				
Lime.....cwt.	213,491	151,983	104,598	50,296
Acetate of lime.....cwt.	30,754	53,245	27,433	45,570

SAND AND GRAVEL

Finally revised statistics show a production of 21,213,489 short tons of sand and gravel with a value of \$6,389,440 in 1935 as compared with 14,854,159 short tons worth \$4,035,477 in 1934. Output during both years comprised washed or screened and bank or pit-run material and included a variety of grades for moulding, building, roadwork and other purposes; in 1935 the tonnage of washed or screened products amounted to 42·8 per cent of the total sand and gravel production for the year.

Shipments of sand and gravel for railway ballast and more particularly for concrete and highway construction were largely responsible for the 43 per cent increase in the total tonnage of these materials produced as compared with the output in 1934. Shipments of sand and gravel were reported in 1935 from all provinces with the exception of Prince Edward Island and increases in output over the preceding year were recorded for all provinces other than Saskatchewan. Of the total Canadian output in 1935, Ontario contributed 41·3 per cent; Quebec, 24·8 per cent; New Brunswick, 8·5 per cent; Nova Scotia, 6·7 per cent; and British Columbia, 6·5 per cent.

The number of operators reporting production of sand and gravel during 1935 totalled 1,398 as compared with 794 in 1934 and of the 1935 producers, 23 confined their operations to the production of railway ballast. The industry as a whole reported a capital investment of \$4,849,702 in 1935; the number of employees totalled 3,015 and salaries and wages paid amounted to \$2,479,418. Employment in 1935 realized a 57·8 per cent increase over 1934 while salaries and wages paid represented an increase of 100·5 per cent. Fuel and electricity consumed during 1935 amounted to \$110,300, of which \$52,847 was for coal and \$37,992 for electricity; consumption of process supplies totalled \$5,763.

Imports of silica sand in 1935 for glass and carborundum manufacture, and for use in steel foundries, filtration plants, and sand blasting totalled 123,575 short tons valued at \$282,930 while imports of sand and gravel n.o.p., totalled 98,624 tons valued at \$81,763. Exports of sand and gravel in 1935 amounted to 100,157 tons worth \$21,446, all of which went to the United States.

For several years past the Mines Branch, Department of Mines, Ottawa, has been conducting a general investigation into "Natural Bonded Moulding Sands of Canada" with particular reference to available data concerning all known deposits. Outstanding features shown by this investigation are the large number of deposits from which supplies have been used for local foundries and the probability of replacing some imported materials with Canadian sands.

Production statistics for the sand and gravel industry in Canada were first collected in 1912. Prior to that year the only data available consist of Customs' records of sand and gravel exported. It was not until 1916 that tonnage statements were obtained from the operators in this industry; the total for that year amounted to 8,156,207 tons at \$1,838,320. Since 1918, the annual production has exceeded the 10-million ton mark.

Table 389.—*Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1934 and 1935

Province	1934				
	Capital employed as represented by				
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	Total
	\$	\$	\$	\$	\$
Nova Scotia.....					
New Brunswick.....					
Quebec.....	257,134	2,900	3,180	7,056	270,270
Ontario.....	1,970,191	33,711	109,194	377,686	2,490,782
Manitoba.....	567,058	1,985	32,576	173,798	775,417
Saskatchewan.....					
Alberta.....	1,100				1,100
British Columbia.....	812,612	5,264	5,726	16,380	839,982
Canada.....	3,608,095	43,860	150,676	574,920	4,377,551

Province	1935					
	Capital employed as represented by					
	Present cash value of the land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	\$	\$	\$	\$	\$	\$
Nova Scotia.....						
New Brunswick.....	30,000					30,000
Quebec.....	39,820	133,544	23,092	638	7,695	204,789
Ontario.....	382,528	2,123,761	19,317	99,495	437,867	3,062,968
Manitoba.....	468,619	109,040	9,277	30,030	192,832	809,798
Saskatchewan.....						
Alberta.....		5,000				5,000
British Columbia.....	229,995	481,074	3,863	6,720	15,495	737,147
Canada.....	1,150,962	2,852,419	55,549	136,883	653,889	4,849,702

* Excluding unmined material.

Table 390.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1934 and 1935

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
1934				\$	\$	\$
Nova Scotia.....		170	170		101,443	101,443
New Brunswick.....		266	266		207,202	207,202
Quebec.....	12	917	929	13,685	522,606	536,291
Ontario.....	25	208	233	30,582	170,004	200,586
Manitoba.....	10	48	58	14,509	25,109	39,618
Saskatchewan.....		100	100		62,364	62,364
Alberta.....		78	78		35,564	35,564
British Columbia.....	13	64	77	16,969	36,782	53,751
Canada.....	60	1,851	1,911	75,745	1,161,074	1,236,819
1935						
Nova Scotia.....		357	357		503,191	503,191
New Brunswick.....		842	842		758,131	758,131
Quebec.....	9	1,168	1,177	11,520	744,840	756,360
Ontario.....	34	264	298	41,106	156,499	197,605
Manitoba.....	10	91	101	17,113	78,969	96,082
Saskatchewan.....		100	100		61,599	61,599
Alberta.....		64	64		42,834	42,834
British Columbia.....	16	60	76	19,808	43,808	63,616
Canada.....	69	2,946	3,015	89,547	2,389,871	2,479,418

* See note on page 26.

Table 391.—Number of Wage-Earners, by Months, 1933-1935

Month	1933	1934	1935
January.....	112	122	122
February.....	108	122	116
March.....	131	387	138
April.....	402	596	1,088
May.....	5,646	3,128	6,117
June.....	6,172	3,895	6,664
July.....	6,275	4,167	6,754
August.....	6,381	4,219	6,806
September.....	3,087	2,418	4,988
October.....	762	940	1,483
November.....	586	400	544
December.....	363	316	406

Table 392.—Production* of Sand and Gravel in Canada, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	17,112,798	4,941,434	1931.....	21,748,586	6,651,165
1927.....	22,952,819	6,055,601	1932.....	14,469,942	4,480,596
1928.....	28,102,917	5,809,431	1933.....	11,738,823	4,464,285
1929.....	27,846,945	7,317,814	1934.....	14,854,159	4,035,477
1930.....	28,547,511	8,344,913	1935.....	21,213,489	6,389,440

* Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz. Also does not include sand used for back filling at mines.

Table 393.—Production in Canada, Imports and Exports of Sand and Gravel, 1933-1935

Kind	1933			1934			1935		
	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value
	Tons	Tons	\$	Tons	Tons	\$	Tons	Tons	\$
PRODUCTION—									
Sand—									
Moulding sand.....	3,444	4,273	9,635	1,951	11,278	13,415	1,504	11,709	14,674
Building sand and sand for concrete, roadwork, etc.....	347,410	428,002	218,559	360,576	326,055	209,002	545,402	242,010	264,435
Core sand.....	325		325	405	3,030	2,345	135	1,247	1,464
Other sand (including blast and engine sands).....	216	33,177	6,086	2,072	44,012	10,046	4,014	38,686	9,145
Sand and Gravel—									
Sand and gravel for railway ballast.....	72,338	489,200	110,449	95,566	1,359,052	266,292	42,484	2,224,711	415,092
Sand and gravel for concrete roads, etc.....	6,367,489	3,590,343	3,907,911	4,723,770	7,694,638	3,411,751	8,232,084	9,298,963	5,357,331
Crushed gravel.....	359,395	43,211	211,320	79,578	152,176	122,626	243,841	326,699	327,299
Total.....	7,150,617	4,588,206	4,464,285	5,263,918	9,590,241	4,035,477	9,069,464	12,144,025	6,389,440
IMPORTS—									
Sand, silica, for glass and carborundum manufacture, etc.....	64,114		160,131	96,165		226,188	123,576		282,930
Sand and gravel, n.o.p.	89,017		72,480	61,136		56,900	98,624		81,763
Total.....	153,131		232,611	157,301		283,088	222,200		364,693
EXPORTS.....	102,174		15,801	88,011		17,079	100,157		21,446

NOTE.—Production includes all classes of sand and gravel other than natural silica sand or silica sand manufactured from quartz or silica rock; production of these is recorded under quartz.

Table 394.—Production of Sand and Gravel in Canada, by Railway Operators, 1933-1935

Kind	1933		1934		1935	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
Sand—						
Moulding sand.....	203	300				
Building sand and sand for concrete, roads, etc.....	10,120	2,092	202	41	831	271
Other sand (including blast, core and engine sands).....	29,247	5,509	40,634	6,174	34,238	6,431
Sand and gravel—						
Sand and gravel for railway ballast.....	472,921	79,371	1,275,448	213,591	2,163,329	387,043
Sand and gravel for concrete, roads, etc.....	215,739	35,348	296,301	49,149	432,120	67,227
Crushed gravel.....			1,755	325		
Total.....	728,230	122,620	1,614,340	269,280	2,630,518	460,972

Table 395.—Production of Sand and Gravel in Canada, by Operators Other than Railways, 1933-1935

Kind	1933			1934			1935		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$	Tons	Tons	\$
Sand—									
Moulding sand.....	3,444	4,070	9,335	1,951	11,278	13,415	1,504	11,709	14,674
Building sand and sand for concrete, roads, etc.....	347,410	417,882	216,467	360,576	325,853	208,961	545,402	241,179	264,164
Core sand.....	325		325	405	3,030	2,345	135	1,247	1,464
Other sand (including blast, and engine sands).....	216	3,930	577	2,072	3,378	3,872	4,014	4,448	2,714
Sand and gravel—									
Sand and gravel for railway ballast.....	72,338	16,279	31,078	95,566	83,604	52,701	42,484	61,382	28,049
Sand and gravel for concrete, roads, etc.....	6,367,489	3,374,604	3,872,563	4,723,770	7,398,337	3,362,602	8,232,084	8,866,843	5,290,104
Crushed gravel.....	359,395	43,211	211,320	79,578	150,421	122,301	243,841	326,699	327,299
Total.....	7,150,617	3,859,976	4,341,665	5,263,918	7,975,901	3,766,197	9,069,464	9,513,507	5,928,468

Table 396.—Production of Sand for Building and Concrete, Roads, Etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, Etc., 1931-1935

Year	SAND		SAND AND GRAVEL			
	For building, concrete, roads, etc.		For railway ballast		For concrete roads, etc.	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1931.....	3,189,248	1,069,210	3,593,451	459,531	14,352,283	4,784,298
1932.....	2,368,304	745,091	2,097,224	324,648	9,604,113	3,181,105
1933.....	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331

NOTE.—For consumption of silica and silica sands see table 260, chapter 8.

Table 397.—Production of Sand and Gravel in Canada, by Provinces, 1933-1935

Kind	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1933								
Sand—								
Moulding sand.....tons			45	7,560	91			21
\$			40	9,332	137			126
Building sand and sand for concrete, roadwork, etc.....tons		3,480	649,720	92,181	24,308	744		4,979
\$		2,626	180,172	26,625	6,437	1,378		1,321
Core sand.....tons				325				
\$				325				
Other sand (including blast sand, engine sand, etc.).....tons		729	3,332	5,197	756	12,571	3,611	7,197
\$		176	630	942	112	2,428	597	1,201
Sand and gravel—								
Sand and gravel for railway ballast.....tons	31,441	50,661	60,696	279,637	16,123	76,425	15,753	30,802
\$	5,633	10,238	12,684	59,748	2,702	11,213	2,248	5,983
Sand and gravel for concrete, roads, etc.....tons	230,787	442,091	2,378,290	5,456,486	243,901	14,660	261,758	909,859
\$	120,398	318,457	622,766	2,340,730	97,665	4,712	82,732	320,451
Crushed gravel.....tons			264,149	126,608	3,035			8,814
\$			126,137	79,528	1,775			3,880
Total.....tons	282,228	496,961	3,356,232	5,967,994	288,214	104,400	281,122	961,672
\$	126,031	331,497	942,429	2,517,230	108,828	19,731	85,577	332,962
1934								
Sand—								
Moulding sand.....tons				12,908	321			
\$				12,998	417			
Building sand and sand for concrete, roadwork, etc.....tons	1,350		510,205	145,703	20,294	2,768	1,222	5,089
\$	200		144,060	56,386	6,335	205	480	1,336
Core sand.....tons			252	1,306	1,877			
\$			126	1,524	695			
Other sand (including blast sand, engine sand, etc.).....tons		520	8,471	4,813		20,979	6,450	4,851
\$		167	4,729	710		2,377	1,195	868
Sand and gravel—								
Sand and gravel for railway ballast.....tons	41,726	141,304	230,989	651,516	98,791	166,149	34,259	89,884
\$	7,726	22,063	45,916	130,624	16,101	19,861	5,402	18,059
Sand and gravel for concrete, roads, etc.....tons	213,496	426,240	2,750,006	7,046,018	181,727	343,679	608,301	848,941
\$	106,671	299,468	692,500	1,610,934	55,898	146,590	189,821	309,869
Crushed gravel.....tons			172,659	18,695	31,016			9,384
\$			93,123	8,513	15,980			5,010
Total.....tons	256,572	568,064	3,672,582	7,880,959	334,026	533,575	650,232	958,149
\$	114,597	322,238	980,454	1,821,689	95,426	169,033	196,896	335,142

Table 397.—Production of Sand and Gravel in Canada, by Provinces, 1933-1935
Concluded

Kind		Nova Scotia	New Brun- swick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia
1935									
Sand—									
Moulding sand.....	tons	30		10	12,804	369			
	\$	75		20	14,225	354			
Building sand and sand for con- crete, roadwork, etc.....	tons		337	452,299	273,725	41,999		5,803	13,249
	\$		62	158,073	87,343	12,362		2,411	4,184
Core sand.....	tons				1,114	268			
	\$				1,265	199			
Other sand (including blast sand, engine sand, etc.).....	tons		837	5,778	8,768		19,811	3,878	4,433
	\$		135	1,086	8,158		3,576	662	508
Sand and gravel—									
Sand and gravel for railway ballast.....	tons	67,459	122,572	335,705	517,655	523,601	156,966	325,972	217,265
	\$	9,715	19,575	62,633	104,711	92,211	23,509	62,219	40,519
Sand and gravel for concrete, roads, etc.....	tons	1,356,068	1,689,460	4,130,744	7,831,472	739,975	326,455	318,158	1,138,715
	\$	676,183	826,189	1,006,369	1,919,533	273,775	144,085	80,800	430,397
Crushed gravel.....	tons			344,451	124,584	93,447			8,053
	\$			214,287	81,171	25,529			6,012
Total.....	tons	1,423,557	1,813,395	5,268,987	8,770,117	1,399,659	502,732	653,511	1,381,720
	\$	685,973	845,981	1,442,468	2,211,405	404,730	171,170	146,092	481,620

SAND-LIME BRICK INDUSTRY

On account of its association with other building materials data regarding the production of sand-lime brick are included in this report. Statistics relating to sand-lime brick are not included in the totals for structural materials industries as both the sand and lime used have been so recorded; production of sand-lime brick is regarded as a manufacturing operation and therefore is shown in the report on the *Manufactures of the Non-Metallic Minerals*, issued annually by the Bureau.

Only 6 factories in Canada manufactured sand-lime building brick during 1935; 2 were in Quebec and 4 in Ontario, the latter all in the vicinity of Toronto. The value of all products, including brick, building blocks and some ready-mixed mortar was \$154,950 compared with \$174,069 for the same works in 1934.

Output of sand-lime brick in 1935 was reported at 10,522 M valued at \$120,307 at factory prices, a decline of 17 per cent in quantity and 11 per cent in value from the 1934 totals of 12,744 M and \$135,588. Production of sand-lime building blocks increased to 259 M at \$31,581 from 240 M at \$27,782 in 1934.

The average number of employees in this industry was 71, including 14 on salaries and 57 on wages. The number of wage-earners fluctuated from 29 in February to 90 in June, 91 in September and 48 in November. Payments for salaries and wages totalled \$58,700 in 1935 as against \$65,996 in 1934.

Capital employed during 1935 amounted to \$608,899, including \$511,450, as the value of plants and equipment, \$47,744 as the value of inventories at the end of the year and \$49,705 as the total of cash and other operating capital.

Table 398.—Production of Sand-Lime Brick in Canada, 1931-1935

Year	Ontario		Other provinces		Canada	
	Quantity	Selling value at works	Quantity	Selling value at works	Quantity	Selling value at works
	M	\$	M	\$	M	\$
1931.....	34,400	313,189	11,603	156,594	46,003	469,783
1932.....	6,823	78,398	3,996	53,042	10,819	131,440
1933.....	6,922	69,784	1,619	21,684	8,541	91,468
1934.....	10,585	107,528	2,159	28,060	12,744	135,588
1935.....	8,730	97,074	1,792	23,233	10,522	120,307

THE STONE INDUSTRY IN CANADA

Including (1) the Stone Quarrying Industry and (2) the Monumental and Ornamental Stone Industry

The stone industry in Canada comprises two main divisions: (1) The Stone Quarrying Industry, including quarries and dressing works operated in conjunction with quarries, and (2) The Monumental and Ornamental Stone Industry, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the monumental and ornamental stone industry are included under manufacturing. For convenience this report carries data for both of these industries.

These two major divisions, constituting the Canadian stone industry, represented a capital investment of \$17,458,405 in 1935. Production during the year totalled \$7,267,846 which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1935 numbered 3,541, and their combined earnings amounted to \$3,124,927.

The two industries are treated separately in the following review.

(1) PRIMARY PRODUCTION—THE STONE QUARRYING INDUSTRY

The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are widely distributed throughout Canada. The products from quarries operating in these formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their growing requirements.

Shipments of limestone, granite, sandstone, and marble from Canadian quarries during 1935 amounted to 4,316,818 short tons valued at \$5,303,234 as compared with an output of 4,077,016 short tons worth \$4,152,329 in 1934. Quarry production in both years comprised shipments of crude, dressed and various grades of crushed stone. The 1935 sales represent increases of 5.9 per cent in tonnage and 27.7 per cent in value over those of the preceding year and the value of the 1935 production was the greatest since 1931. The total tonnage of stone produced in 1935 included 3,631,665 tons of limestone, 342,824 tons of sandstone, 326,354 tons of granite and 15,975 tons of marble. In addition to this production, 1,129 tons of slate valued at \$4,329 were shipped; 818,443 tons of limestone consumed in the cement industry, and approximately 700,000 tons of limestone burned in the manufacture of lime.

Stone was produced commercially during 1935 in every province with the exception of Prince Edward Island and Saskatchewan; of the total tonnage of all stone produced, Ontario contributed 49.2 per cent; Quebec, 32.2 per cent; British Columbia, 8.3 per cent; and Nova Scotia, 4.9 per cent. The value of Quebec stone shipments totalled \$2,053,761 or 38.7 per cent of the total for the Dominion; those in Ontario amounted to \$1,863,892, or 35.1 per cent; while those of Nova Scotia ranked third with a valuation of \$621,832.

Shipments of building stone, other than ornamental or monumental, totalled 200,899 tons in 1935 or an increase of 281.5 per cent over those of 1934; stone sold for chemical purposes totalled 537,799 tons as compared with 489,580 tons in the preceding year and stone for railroad ballast increased from 345,802 tons in 1934 to 351,302 tons in 1935. There was a relatively small decrease during 1935 in the tonnage of stone sold for concrete aggregate and highway construction.

In the entire industry, salaries and wages totalling \$1,950,698 were paid to 2,475 employees in 1935 as compared with \$1,499,272 distributed to 2,087 in 1934. Of the 1935 totals \$968,879 were paid to 1,452 employees engaged in the Province of Quebec; \$559,809 to 595 employees in Ontario, and \$130,612 to 138 employees in Nova Scotia.

The following excerpts are from reports No. 742 and No. 773, issued by the Mines Branch, Department of Mines and Resources, Ottawa: "Limestones are rocks of sedimentary origin consisting mainly of calcium carbonate (calcite) or of the double carbonate of calcium and

magnesium (dolomite). Based on their content of these constituents, limestones may be divided into three classes:

1. Calcium Limestones, or those in which calcium carbonate greatly predominates and which contain less than 10 per cent magnesium carbonate.
2. Dolomites, or those composed almost wholly of the mineral dolomite and which contain between 40 and 45.65 per cent magnesium carbonate.
3. Magnesium Limestones, or those intermediate in composition between the other two classes.

"The distinction between the classes is purely arbitrary. By pure limestone is meant one with less than 5 per cent total impurities—all limestone deposits contain some sandy or clayey material, and the deposits may grade almost imperceptibly into shale, sandstone, or other type of rock.

"The rock wool industry, which was established in Canada in 1934 following the publication, by the Mines Branch of the results of investigations which showed that large deposits of argillaceous dolomite in Ontario were suitable for the manufacture of this commodity is developing rapidly. Early in 1936 there were two rock wool plants in Ontario, and one in Quebec, making slag wool.

"New uses are continually being developed for limestone, particularly for ground or pulverized material. Soft, pure limestone ground to a specified degree is being used for cleaning soft-metal moulds by a process similar to sand-blasting. Pulverized high-calcium limestone, occasionally with iodine added, is being rather extensively used as an ingredient of poultry and stock goods. The forcing of a thick slurry made of limestone screenings and water beneath sunken portions of pavement has proved a satisfactory method of raising the pavement to grade. Increasing quantities of ground dolomite are now being used for agricultural purposes.

"There are many deposits of beautifully coloured marbles in Canada, particularly in Ontario, Quebec and British Columbia; at present there is little call for red and blue marbles, but buff and black marbles are in vogue; marble quarries are operated in Quebec, Ontario, Manitoba and British Columbia.

"Stone quarried by the granite industry consists of granite and other related crystalline igneous rocks used for building, decorative, monumental or construction purposes. Producing properties are situated in a number of localities in the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia. Canadian granites are suitable for all the purposes for which granite is used."

Canadian sandstone has been utilized extensively in the construction of many important public buildings in the Dominion; the rock occurs in Canada in a variety of colours and was produced during 1935 in Nova Scotia, New Brunswick, Quebec, Ontario and British Columbia.

An interesting development in the Canadian slate industry was the coming into production during 1936 of a new slate mill erected near Madoc, Ontario; it was reported that this plant will produce slate granules, slate flour, and structural slate, including roofing slates, from crude material obtained from a local deposit.

Table 399.—*Capital Employed in the Stone Quarrying Industry in Canada, by Provinces, 1934 and 1935

Province	1934				
	Capital employed as represented by				Total
	Present value of land, buildings, machinery and tools	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	
	\$	\$	\$	\$	\$
Nova Scotia.....	650,486	20,394	11,500	3,473	685,853
New Brunswick.....	142,855	10,342	7,015	34,991	195,203
Quebec.....	4,313,765	365,464	121,019	708,635	5,508,883
Ontario.....	4,756,566	142,507	138,128	399,547	5,436,748
Manitoba.....	457,198	40,399	.....	49,644	547,241
Alberta.....	.....	.....	.....	.....	.....
British Columbia.....	533,479	34,740	15,041	26,648	609,908
Canada.....	10,854,349	613,846	292,703	1,222,938	12,983,836

* Excluding unmined material.

DOMINION BUREAU OF STATISTICS

Table 399.—*Capital Employed in the Stone Quarrying Industry in Canada, by Provinces, 1934 and 1935—Concluded

Province	1935					Total
	Capital employed as represented by					
	Present cash value of the land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stone in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	527,441	100,600	37,358	8,750	8,007	682,156
New Brunswick.....	91,650	76,050	9,009	6,562	26,230	209,501
Quebec.....	2,460,533	2,316,908	332,048	154,773	399,744	5,664,006
Ontario.....	531,153	3,322,794	69,676	165,694	286,873	4,376,190
Manitoba.....	186,899	240,505	31,095	.....	84,126	542,625
Alberta.....	.....	.....	.....	.....	.....	.....
British Columbia.....	299,909	295,964	52,509	16,186	138,472	803,040
Canada.....	4,097,585	6,352,821	531,695	351,965	943,452	12,277,518

* Excluding unmined material.

Table 400.—Employees, Salaries and Wages in the Stone Industry in Canada, by Provinces, 1934 and 1935

Province	*Average number of employees			Salaries and wages		
	Salariied employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
1934						
Nova Scotia.....	4	84	88	6,560	61,956	68,516
New Brunswick.....	9	92	101	9,298	71,311	80,609
Quebec.....	103	1,068	1,171	108,443	615,166	723,609
Ontario.....	75	540	615	138,089	363,576	501,665
Manitoba.....	14	20	34	37,325	15,352	52,677
Alberta.....	.....	.....	.....	.....	.....	.....
British Columbia.....	12	66	78	17,370	54,826	72,196
Canada.....	217	1,870	2,087	317,085	1,182,187	1,499,272
1935						
Nova Scotia.....	5	133	138	10,300	120,312	130,612
New Brunswick.....	10	77	87	9,962	50,906	60,868
Quebec.....	101	1,351	1,452	115,651	853,228	968,879
Ontario.....	80	515	595	144,750	415,059	559,809
Manitoba.....	16	71	87	42,498	71,278	113,776
Alberta.....	.....	.....	.....	.....	.....	.....
British Columbia.....	17	99	116	17,110	99,644	116,754
Canada.....	229	2,246	2,475	340,271	1,610,427	1,950,698

* See note page 26.

Table 401.—Number of Wage-Earners in Primary Stone Industries, by Months, 1933-1935

Month	1933	1934	1935	Month	1933	1934	1935
January.....	689	671	779	July.....	2,319	3,172	3,076
February.....	839	676	839	August.....	2,245	2,951	3,318
March.....	899	345	1,069	September.....	2,374	2,703	3,287
April.....	1,157	1,169	1,580	October.....	2,358	2,366	3,175
May.....	1,823	2,065	2,440	November.....	1,853	1,814	2,584
June.....	2,175	2,893	2,890	December.....	1,249	1,115	1,643

Table 402.—Production of Granite* in Canada, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	1,064,423	1,574,627	1931.....	1,190,887	2,763,050
1927.....	730,049	1,383,557	1932.....	490,822	1,110,582
1928.....	1,195,810	2,366,946	1933.....	256,723	679,585
1929.....	1,728,165	3,080,815	1934.....	200,285	781,739
1930.....	1,851,132	3,379,951	1935.....	326,354	1,126,287

* Includes all igneous rock.

Table 403.—Production of Limestone and Sandstone in Canada, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Limestone		Sandstone		Year	Limestone		Sandstone	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1926.....	5,283,745	5,657,328	44,127	112,347	1931.....	6,262,430	6,305,538	924,101	1,332,883
1927.....	6,438,379	7,145,917	132,799	232,793	1932.....	3,687,241	3,227,715	500,480	349,458
1928.....	6,949,420	7,267,437	100,951	223,236	1933.....	2,572,911	2,142,516	99,043	108,562
1929.....	7,720,840	8,172,681	159,407	398,974	1934.....	3,747,779	3,157,832	115,169	143,283
1930.....	7,732,675	8,075,616	384,610	769,060	1935.....	3,631,665	3,253,573	342,824	838,005

Table 404.—Production of Marble in Canada, 1926-1935

(For the years 1886 to 1925 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1926.....	5,295	521,572	1931.....	20,442	668,713
1927.....	5,209	503,037	1932.....	12,379	250,706
1928.....	7,753	414,682	1933.....	10,897	65,913
1929.....	14,012	414,062	1934.....	13,783	69,475
1930.....	26,089	809,582	1935.....	15,975	85,369

Table 405.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1934 and 1935

Province	Granite	Limestone*	Marble	Sandstone	Total
1934					
Nova Scotia.....	325	105,620		17,123	123,068
	\$ 12,300	135,962		23,055	171,317
New Brunswick.....	5,984	30,356		1,578	37,918
	\$ 76,793	78,441		5,948	161,182
Quebec.....	69,428	1,034,058	9,302	86,364	1,199,152
	\$ 488,477	953,815	47,503	85,822	1,575,617
Ontario.....	75,526	2,370,339	4,331	10,104	2,460,300
	\$ 128,386	1,788,107	20,556	28,458	1,965,507
Manitoba.....	213	42,914			43,127
	\$ 2,702	50,843			53,545
Alberta.....		2,737			2,737
	\$	8,104			8,104
British Columbia.....	48,809	161,755	150		210,714
	\$ 73,081	142,560	1,416		217,057
Canada.....	200,285	3,747,779	13,783	115,169	4,077,016
	\$ 781,739	3,157,832	69,475	143,283	4,152,329
1935					
Nova Scotia.....	525	8,988		202,952	212,465
	\$ 23,800	19,188		578,844	621,832
New Brunswick.....	31,091	53,213		840	85,144
	\$ 103,275	86,001		19,447	208,723
Quebec.....	131,096	1,143,983	10,518	104,920	1,390,517
	\$ 800,685	1,087,320	43,455	122,301	2,053,761
Ontario.....	44,473	2,061,206	4,726	12,536	2,122,941
	\$ 93,465	1,680,810	35,210	54,407	1,863,892
Manitoba.....	387	146,100	127		146,614
	\$ 4,630	183,892	1,233		189,755
Alberta.....		2,242			2,242
	\$	6,981			6,981
British Columbia.....	118,782	215,933	604	21,576	356,895
	\$ 100,432	189,381	5,471	63,006	358,290
Canada.....	326,354	3,631,665	15,975	342,824	4,316,818
	\$ 1,126,287	3,253,573	85,369	838,005	5,303,234

NOTE.—In addition to the above production there were produced 733 tons of slate valued at \$4,802 in 1934 and 1,129 tons at \$4,329 in 1935; also not included in the limestone statistics are 806,546 tons of limestone consumed in the cement industry in 1934 and 818,443 tons in 1935. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 600,000 tons of limestone were burned in the manufacture of lime in 1934.

* Production of limestone in Quebec includes marl used as fertilizer.

Table 406.—Production* of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1934

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough.....tons	8	14	12,867	14,522	460		733	28,604
\$	70	164	32,863	56,386	1,306		3,696	94,485
Dressed.....tons		920	21,975	1,014	150		2	24,061
\$		5,500	376,606	6,774	6,430		306	395,610
Monumental and ornamental—								
Rough.....tons	175	312	3,477	269	213		213	4,659
\$	2,300	5,017	25,921	5,553	2,702		2,482	43,975
Dressed.....tons	150	473	3,326	6			745	4,700
\$	10,000	62,317	171,682	176			28,216	272,391
Flagstone.....tons			47	547			20	614
\$			47	3,745			16	3,808
Curbstone.....tons		68		276			1	345
\$		578	1,066				1	1,645
Paving blocks.....tons		125	4,931	72			32	5,160
\$		1,000	42,411	405			199	44,015
Lining open-hearth furnaces.....tons					602			602
\$					1,129			1,129
Chemical—								
Flux in iron and steel plants.....tons			3,488	86,352	1,789			91,629
\$			9,507	52,026	2,866			64,399
Flux in smelters.....tons			625	112,496		366	32,246	145,733
\$			563	84,909		549	26,595	112,616
Glass factories.....tons			1,450			1,021		2,471
\$			9,419			1,531		10,950
Pulp and paper mills.....tons	4,615	3,807	74,670	29,809	10,575		26,521	149,997
\$	8,507	5,502	61,057	26,181	10,649		32,466	144,362
Sugar refineries.....tons		50		12,626	6,623			19,299
\$		185		9,470	7,620			17,275
Other chemical uses.....tons			2,810	76,770	371		500	80,451
\$			2,067	93,167	575		2,018	97,827
Whiting.....tons								
\$								
Asphalt filler.....tons	237	318	19,005	1,076				20,636
\$	948	1,273	36,867	4,861				43,949
Dusting coal mines.....tons						658		658
\$						2,632		2,632
Agricultural purposes.....tons	2,958	19,348	38,383	20,702			173	81,564
\$	8,367	60,958	59,282	12,827			692	142,126
Rock wool.....tons				229				229
\$				321				321
Roofing.....tons				4,582				4,582
\$				36,345				36,345
Poultry grit.....tons	12	120	1,090	368		692	100	2,382
\$		120	4,646	552		3,392	654	10,144
Stucco dash.....tons			1,213	1,754			28	2,995
\$			7,323	6,729			306	14,358
Terrazzo flooring.....tons			74	608	170			852
\$			501	2,432	379			3,312
Rubble and riprap.....tons	216	1,171	122,060	12,177	2,678		37,103	175,405
\$	399	568	66,018	7,575	2,330		31,302	108,192
Concrete aggregate.....tons			420,719	400,380				821,099
\$			311,960	296,280				608,240
Crushed stone—Road metal.....tons	114,709	11,300	411,270	1,413,113	19,128		92,967	2,062,587
\$	140,726	18,000	328,126	1,096,284	17,007		68,784	1,668,927
Railroad ballast.....tons			56,366	270,106			19,330	345,802
\$			31,551	158,418			19,330	209,296
Total.....tons	123,068	37,918	1,199,152	2,460,300	43,127	2,737	210,714	4,077,016
\$	171,317	161,182	1,575,617	1,965,507	53,545	8,104	217,057	4,152,329
Per cent of total.....Quantity	3.0	0.9	29.4	60.4	1.1	0.0	5.2	100.00
Value	4.1	4.0	37.9	47.3	1.3	0.2	5.2	100.00

NOTE.—See footnote to table 405.

* Sales or shipments from quarries.

Table 407.—Production* of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1935

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough.....tons	8,768		20,248	17,648	89,035		305	136,004
\$	65,700		79,057	124,103	45,763		1,520	316,143
Dressed.....tons	998	640	25,207	10,579	26,600		871	64,895
\$	46,944	19,367	626,449	93,487	113,179		43,172	942,598
Monumental and ornamental—								
Rough.....tons	100	419	4,681	589	19		75	5,883
\$	1,800	4,195	41,334	13,466	579		2,328	63,702
Dressed.....tons	155	500	7,963	12			650	9,280
\$	10,000	67,307	171,393	400			30,148	279,248
Flagstone.....tons			407	573				980
\$			357	3,117				3,474
Curbstone.....tons		82	1,266				3	1,351
\$		973	8,977				102	10,052
Paving blocks.....tons		90	7,248				4	7,342
\$		800	66,678				60	67,538
Lining open-hearth furnaces.....tons					562			562
\$					1,187			1,187
Chemical—								
Flux in iron and steel plants.....tons			3,001	133,324	1,891			138,216
\$			8,086	81,706	3,044			92,836
Flux in smelters.....tons			500	111,982			18,931	131,413
\$			300	78,900			14,822	94,022
Glass factories.....tons			1,718			990		2,708
\$			10,368			1,484		11,852
Pulp and paper mills.....tons	4,893	4,483	77,212	33,559	7,666		33,057	160,870
\$	7,998	6,500	63,948	28,884	7,366		51,088	165,784
Sugar refineries.....tons		75		16,668				16,743
\$		300		12,501				12,801
Other chemical uses.....tons	72		42	87,705	30			87,849
\$	468		273	105,627	46			106,414
Whiting.....tons				96			94	190
\$				120			1,175	1,295
Asphalt filler.....tons	162		3,451	3,110				6,723
\$	972		8,571	11,326				20,869
Dusting coal mines.....tons			175			565		740
\$			381			2,260		2,641
Agricultural purposes.....tons	3,321	14,500	61,056	8,766		163	78	87,884
\$	8,730	45,300	73,207	6,504		653	322	134,716
Rock wool.....tons				1,173				1,173
\$				873				873
Roofing.....tons				3,660			15	3,675
\$				29,250			150	29,400
Poultry grit.....tons	2		70	1,162	443	514	144	2,335
\$	20		560	3,985	640	2,572	927	8,704
Stucco dash.....tons			568	1,015			89	1,672
\$			4,250	3,428			976	8,654
Terrazzo flooring.....tons			1,009	426	27			1,462
\$			5,417	1,153	133			6,703
Rubble and riprap.....tons		1,355	174,613	35,680	1,640		101,196	314,484
\$		981	113,960	26,599	984		56,013	198,537
Concrete aggregate.....tons	538		483,147	321,014		10	10	804,719
\$	1,000		291,333	231,402		12	100	523,847
Crushed stone								
Road metal.....tons	193,456	63,000	504,773	1,029,396	18,701		167,037	1,976,363
\$	478,200	63,000	470,221	833,249	16,834		125,847	1,987,351
Railroad ballast.....tons			12,162	304,804			34,336	351,392
\$			8,641	173,812			29,540	211,993
Total.....tons	212,465	85,144	1,390,517	2,122,941	146,614	2,242	356,895	4,316,818
\$	621,832	208,723	2,653,761	1,863,892	189,755	6,981	358,290	5,303,234
Per cent of total.....Quantity	4.92	1.97	32.21	49.18	3.40	0.05	8.27	100.00
Value	11.73	3.93	38.73	35.15	3.58	0.13	6.75	100.00

NOTE.—See footnote to table 405.

* Sales or shipments from quarries.

Table 408.—*Production of Stone in Canada, by Kinds, Showing Purposes for Which Used, 1934 and 1935

Kind	Granite		Limestone		Marble		Sandstone	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
Building—								
Rough.....	1934 4,752	16,228	14,493	50,682	1,000	4,000	8,359	23,575
1935	5,135	52,925	105,086	128,245	564	13,134	25,219	121,839
Dressed.....	1934 10,105	216,574	13,036	173,536	.....	.....	920	5,500
1935	10,315	403,951	52,192	425,247	165	16,000	2,223	97,400
Monumental and ornamental—								
Rough.....	1934 4,325	37,464	47	349	287	6,162	.....	.....
1935	5,313	48,859	81	215	489	14,028	.....	.....
Dressed.....	1934 4,212	244,286	123	3,488	358	24,342	7	275
1935	9,231	277,568	49	1,680	.....	.....	.....	.....
Flagstone.....	1934 20	16	82	67	.....	.....	512	3,725
1935	.....	.....	407	357	.....	.....	573	3,117
Curbstone.....	1934 345	1,645	.....	.....	.....	.....	.....	.....
1935	1,351	10,052	.....	.....	.....	.....	.....	.....
Paving blocks.....	1934 5,160	44,015	.....	.....	.....	.....	.....	.....
1935	7,342	67,538	.....	.....	.....	.....	.....	.....
Lining open-hearth furnaces.....	1934	.....	602	1,129	.....	.....	.....	.....
1935	.....	.....	562	1,187	.....	.....	.....	.....
Chemical—								
Flux in iron and steel plants.....	1934	.....	91,629	64,399	.....	.....	.....	.....
1935	.....	.....	138,216	92,836	.....	.....	.....	.....
Flux in smelters.....	1934	.....	145,733	112,616	.....	.....	.....	.....
1935	.....	.....	131,413	94,022	.....	.....	.....	.....
Glass factories.....	1934	.....	1,021	1,531	1,450	9,419	.....	.....
1935	.....	.....	990	1,484	1,718	10,368	.....	.....
Pulp and paper mills.....	1934	.....	146,767	141,989	3,230	2,373	.....	.....
1935	.....	.....	158,314	163,767	2,556	2,017	.....	.....
Sugar refineries.....	1934	.....	19,299	17,275	.....	.....	.....	.....
1935	.....	.....	16,743	12,801	.....	.....	.....	.....
Other chemical uses.....	1934	.....	77,641	95,760	2,810	2,067	.....	.....
1935	.....	.....	87,849	106,414	.....	.....	.....	.....
Whiting.....	1934	.....	.....	.....	190	1,295	.....	.....
1935	.....	.....	.....	.....	.....	.....	.....	.....
Asphalt filler.....	1934 171	1,368	20,465	42,581	.....	.....	.....	.....
1935	51	408	6,672	20,461	.....	.....	.....	.....
Dusting coal mines.....	1934	.....	658	2,632	.....	.....	.....	.....
1935	.....	.....	740	2,641	.....	.....	.....	.....
Agricultural purposes.....	1934	.....	81,564	142,126	.....	.....	.....	.....
1935	.....	.....	87,879	134,686	5	30	.....	.....
Rock wool.....	1934	.....	229	321	.....	.....	.....	.....
1935	.....	.....	1,173	873	.....	.....	.....	.....
Roofing.....	1934 4,457	35,656	125	689	.....	.....	.....	.....
1935	3,623	28,984	.....	.....	52	416	.....	.....
Poultry grit.....	1934 6	90	1,289	5,304	1,087	4,750	.....	.....
1935	7	105	1,096	4,054	1,232	4,545	.....	.....
Stucco dash.....	1934	.....	146	943	2,849	13,415	.....	.....
1935	.....	.....	84	876	1,588	7,778	.....	.....
Terrazzo flooring.....	1934	.....	170	379	682	2,933	.....	.....
1935	.....	.....	.....	.....	1,182	6,509	280	194
Rubble and riprap.....	1934 38,212	32,261	105,578	56,876	.....	.....	.....	.....
1935	139,648	89,235	166,142	100,887	30	14	31,585	19,041
Crushed stone—								
Concrete aggregate.....	1934 22,680	23,278	789,856	574,271	.....	.....	8,563	10,691
1935	17,026	10,138	771,591	502,735	1,252	3,824	14,850	7,150
Road metal.....	1934 105,840	128,858	1,897,307	1,466,943	.....	.....	59,340	73,126
1935	113,712	127,390	1,590,420	1,278,652	.....	.....	272,231	581,309
Railroad ballast.....	1934	.....	339,919	201,946	.....	.....	5,883	7,350
1935	13,600	9,134	313,966	179,453	.....	.....	23,736	23,406
Total.....	1934 200,285	781,739	3,747,779	3,157,532	13,783	69,475	115,169	143,283
1935	326,354	1,126,287	3,631,665	3,253,578	15,975	85,369	342,824	888,005

* For production of slate see Table 412 also footnote to Table 405.

Table 409.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railroad Ballast, 1931-1935

	Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture
1931.....	tons 129,345	333,699	3,275,276	3,122,633	652,352	2,489,147
	\$ 3,717,993	314,088	2,565,204	2,557,515	485,447	
1932.....	tons 62,951	226,966	1,929,756	1,847,371	89,835	1,141,376
	\$ 1,035,571	188,820	1,320,088	1,474,870	84,930	
1933.....	tons 40,299	315,287	981,460	1,212,981	93,624	616,364
	\$ 340,852	297,652	682,213	969,504	52,359	
1934.....	tons 52,665	489,580	821,099	2,062,487	345,802	806,546
	\$ 490,095	447,429	608,240	1,668,927	209,296	
1935.....	tons 200,899	537,799	804,719	1,976,363	251,302	818,443
	\$ 1,258,741	483,709	523,847	1,987,351	211,993	

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry.

Table 410.—Consumption of Whiting, by Uses, as Reported to the Annual Census of Industry, 1934-1935

	1934		1935	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Paints.....	5,432	95,556	5,921	103,837
Rubber.....	5,161	86,242	5,101	110,784
Oilcloth and linoleum.....	688	13,932	671	13,425
Ammunition.....	8	244	10	291
Miscellaneous non-metallic manufactures.....	2	42	14	680
Total accounted for.....	11,291	196,016	11,717	229,017

THE THERMAL CONDUCTIVITY OF SUNDRY MATERIALS

The Thermal Conductivity of many of the commoner insulating materials has become a matter of some economic importance ever since the public has appreciated the fact that by insulating the walls of houses, substantial savings in fuel consumption can be effected. The National Research Council is equipped with a hot-plate for measuring the heat transmission of small samples 18 inches square and a hot-box for measuring large samples 6 feet square in the form of walls. Some results obtained on their hot-plate apparatus are given in the following table.

Table 411.—The Thermal Conductivity of Sundry Materials (1)

Material	Thickness (inches)	Moisture %	Density lb. per cu. ft.	Mean Temp. °F.	Conductivity B.T.U., per hr., per sq. ft., per °F., per in.
Wood fibre.....	0-520	4-3	16-0	52	0-358
Cardboard.....	0-199	7-8	31-8	54	0-449
Cork.....	1-029	0-9	11-5	46	0-302
Plaster board.....	0-379	8-0	48-8	31	0-998
Flax waste.....	0-833	6-4	10-8	50	0-323
Eel-grass.....	0-228	9-7	6-5	46	0-251
Animal wool.....	0-273	8-1	7-9	51	0-229
Asbestos cement.....	1-130	1-0	45-0	44	1-100
Gypsum.....	1-021	0-9	11-0	46	0-357
Asbestos and crushed rock.....	1-079	0-5	80-0	65	1-48
Lime and diatomite.....	1-341	2-0	42-0	56	0-87
Concrete and cinder.....	2-690		48-5	58	1-28
Rock wool.....	1-100	Negligible	6-1	55	0-247
Sphagnum peat moss.....	1-106	11-0	3-9	58	0-264

(1) Contributed by C. D. Niven—Physicist, National Research Laboratories, Ottawa. It is also interesting to note that the National Research Council, Ottawa, is equipped with an apparatus for testing the insulation afforded by diatomite brick up to a mean temperature of 1400° F.

SLATE

Slate deposits located along the south shore of the St. Lawrence river in Quebec, were operated for the first time in 1854. Production from these deposits reached a maximum in point of value in 1889 when 6,935 tons valued at \$119,160 were shipped. These shipments consisted of roofing slates, mantels and slabs. Quarrying operations were carried on at the Quebec deposits up to 1923, in which year 1,836 tons of crushed green and red slate were shipped for use in the manufacture of roofing material.

No slate was produced in Canada from 1923 to 1929, each year since 1930 there has been a production of the material and in 1935 shipments of slate were made from quarries located at Broughton Station, Quebec, and Sooke Lake, British Columbia.

An interesting development in the Canadian slate industry was the coming into production during 1936 of a new slate mill erected near Madoc, Ontario; it was reported that this plant will produce slate granules, slate flour, and structural slate, including roofing slates, from crude material obtained from a local deposit.

Table 412.—Production of Slate in Canada, 1924-1935

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924-1929.....			1933.....	250	3,750
1930.....	150	3,000	1934.....	738	4,802
1931.....	250	5,000	1935.....	1,129	4,329
1932.....	250	3,750			

NOTE.—For years 1886 to 1923 see previous reports. For imports and exports of slate see table 413.

Table 413.—Imports into Canada and Exports of Stone, by Kinds, 1934 and 1935

	1934		1935	
	Tons	Value	Tons	Value
		\$		\$
IMPORTS—				
Curling stones and handles.....pair	113	2,645	412	10,079
Building stone, other than marble or granite, sawn on more than two sides, but not sawn on more than four sides.....			8	138
Building stone, other than marble or granite, planed, turned, cut, or further manufactured than sawn on four sides.....	1	122	20	1,127
Flagstone, sandstone, and all building stone, not hammered, sawn or chiselled.....	3,155	16,879	4,749	20,193
Flagstone and building stone, other than marble or granite, sawn on not more than two sides.....	305	2,748	514	3,091
Granite, rough, not hammered or chiselled.....		65,925		65,185
Granite, sawn only.....		4,961		8,336
Granite, monuments.....		19,036		22,008
Granite, manufactures, of, n.o.p.....		8,212		3,607
Marble, rough, not hammered or chiselled.....		3,144		4,926
Marble, sawn or sand rubbed, not polished.....		11,322		9,685
Marble, not further manufactured than sawn for tombstones.....		15,078		15,246
Marble, manufactures of, n.o.p.....		8,440		9,640
Paving blocks of stone.....				
Refuse stone, not sawn, hammered or chiselled.....	364,088	200,398	382,186	202,416
Slate roofing.....		12,476		11,197
Slate pencils.....		468		2,517
Slates, writing.....		18,354		16,379
Slate mantels and manufactures of slate, n.o.p.....		9,671		6,295
Chalk, china, Cornwall or cliff stone and mica schist.....		21,371		20,229
Mineral wool.....	1,494	69,267	962	57,877
Whiting, gilders' whiting and Paris white.....	12,034	119,643	12,333	118,451
Manufactures of stone, n.o.p.....		22,136		19,416
Lithographic stones not engraved.....		211		391
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		25,142		30,971
Grindstones, not mounted, and not less than 36 inches in diameter.....No.	1,024	140,327	1,089	140,208
Total.....		797,973		799,608
EXPORTS—				
Crushed stone.....	52,273	94,794	54,669	98,244
Granite and marble, unwrought.....	1,153	9,766	1,255	10,301
Freestone, limestone, and other building stone, unwrought.....			47	433
Dressed stone of all kinds.....		409		1,917
Grindstones, manufactured.....		4,947		74
Total.....		109,916		110,969

(2) Secondary Production—The Monumental and Ornamental Stone Industry

In 1935 there were 222 stone dressing works which were not operated in conjunction with the producers' own quarries. These works were occupied chiefly in cutting and polishing rough stone purchased from Canadian quarries or imported from foreign countries to produce finished monuments or dressed stone for building purposes. Gross production from these establishments was valued at \$3,079,118 in 1935 compared with \$2,407,474 in 1934. Output from the 116 plants in Ontario totalled \$1,794,919 or 58 per cent of the total for Canada, and production from the 49 works in Quebec amounted to \$672,970 or 22 per cent of the Dominion total.

The average number of employees in this industry in 1935 was 1,066 compared with 881 in 1934 and payments in salaries and wages advanced to \$1,174,229 from \$886,809.

The cost of rough stone and other materials used in manufacturing was \$1,010,999 in 1935 as against \$834,323 in 1934.

Output value of building stone was more than double the 1934 figure but was still much below the levels of pre-depression years. In 1935 the total value of dressed building stone including that produced in both the primary and secondary industries was \$2,094,843 compared with \$849,748 in 1934, \$666,973 in 1933, \$1,949,199 in 1932 and \$6,819,615 in 1931.

The total value of dressed stone for monumental and ornamental purposes was \$1,732,601 in 1935, \$1,738,362 in 1934, \$1,560,521 in 1933, \$1,586,861 in 1932 and \$2,143,030 in 1931.

Table 414.—Production from the Monumental and Ornamental Stone Industry, by Provinces, 1934 and 1935

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monuments	For building purposes	Monuments	For building purposes		Monuments and bases	For building purposes			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island										
1934	9,410		9,805					4,560	212	23,987
1935	8,300		12,511			2,000		7,811		30,622
Nova Scotia—										
1934	64,102		13,741			1,679		25,330	2,554	107,406
1935	58,039		10,589	200		2,430		22,212	1,824	95,294
New Brunswick—										
1934	40,656		2,679			315		2,428	177	46,255
1935	33,665	1,710	1,725			1,785		2,225	433	41,543
Quebec—										
1934	327,867	17,865	21,652	35,812	672	1,110	106,119	25,243	15,958	552,298
1935	270,464	73,659	22,181	41,721	647	2,130	215,450	31,294	15,424	672,970
Ontario—										
1934	663,325	5,672	61,470	80,752		13,027	164,964	303,070	37,118	1,329,398
1935	707,889	60,395	64,565	64,882	2,775	9,605	566,538	271,187	47,083	1,794,919
Manitoba—										
1934	54,353	150	12,027	7,226	50	3,569	5,194	26,700	2,018	111,287
1935	56,793	20,093	6,661	13,539	900	2,139	27,382	25,601	735	153,843
Saskatchewan—										
1934	25,943	810	21,671		1,688	4,811	4,002	10,129	3,160	72,214
1935	40,200	5,043	18,206	2,450	500	5,751	13,615	9,597	2,752	98,114
Alberta—										
1934	48,091	11,000	17,612	5,650	40	2,525		9,360	1,040	95,318
1935	48,048	6,000	15,136	4,000	7,013	850	15,000	5,495	1,626	103,168
British Columbia—										
1934	37,262	460	7,544	8,462				13,902	1,681	69,311
1935	45,016	17,133	6,675	3,435	35			14,134	2,217	88,645
Canada—										
1934	1,271,009	35,957	168,201	137,902	2,450	27,036	280,279	420,722	63,918	2,407,474
1935	1,268,414	184,033	158,249	130,227	11,870	26,690	837,955	389,556	72,094	3,079,118

APPENDIX ONE

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1935.

Arsenic.—White arsenic (As_2O_3) shipped from Canadian smelters at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining, at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the net amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made by British Columbia, Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20·671834 per fine ounce until the end of 1930. For succeeding years unless otherwise specified gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price for the refined metal in Canadian funds.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London in Canadian funds.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements of quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

DIRECTORY OF FIRMS

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given and the location of the properties worked in 1935 is also shown.

METAL MINING INDUSTRIES

Alluvial Gold Mining Industry

Name	Head office address	Location
QUEBEC—		
Dion, Geo. A.	19 Rue St. Etienne, Levis.	Rivière des Plantes
BRITISH COLUMBIA—		
Alberta Pacific Cons. Oils, Ltd.	302 Toronto General Trusts Bld., Calgary, Alberta.	Lillooet Mining Div.
Anderson, Oliver.	Fort Steele.	Fort Steele Mining Div.
Andrews, C. Y.	Fort St. James.	Omineca Mining Div.
Antler Placer Mines, Ltd.	724 Nelson St., Vancouver.	Cariboo Dist.
Baker & Peeling.	Keithley Creek.	Quesnel Mining Div.
Brown, E. J.	Wrangell, Alaska.	Clearwater
Boquist, T.	Atlin.	Atlin Lake
Bride, Maurice.	Atlin.	Spruce Creek
Brusset, J. A.	Box 1116, Kelowna.	Osoyoos Mining Div.
Bullion Placers, Ltd.	501 Vancouver Block, Vancouver.	Quesnel River.
Campbell, Robert.	Grand Forks.	Grand Forks Dist.
Cariboo Northern Development Co., Ltd.	1405 Douglas St., Victoria.	Omineca and Cariboo.
Cedar Creek Hydraulic Mines, Ltd.	323 Gayward Bldg., Victoria.	Quesnel Mining Div.
Chadsey, Wm.	Howser.	(a).
Chouse, John.	Barkerville.	Little Summit Creek.
Clarke, F.	Quesnel.	Quesnel River.
Columbia Development Co., Ltd.	410 King St. S., Kitchener, Ont.	Atlin Dist.
Compagnie Française Des Mines du Canada.	19 Rue D'Aumale, Paris, France.	Otter Creek.
Consolidated Gold Alluvials of B.C., Ltd.	708 Vancouver Block, Vancouver.	Cariboo Dist.
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail.	Omineca Mining Div., Fort Steele Mining Div., and Atlin Mining Div.
Daem, John.	Beavermouth.	Quesnel River.
Drayton, Wm. A.	Fort Steele.	Fort Steele Mining Div.
Drinkwater, A.	Wells.	Cariboo Mining Div.
Eastman Red Gulch Placers, Ltd.	Barkerville.	Red Gulch Creek.
Eldorado Placers, Ltd.	1044 Beach Ave., Vancouver.	(a).
Falck, Emil M.	Van Winkle.	Anderson Creek.
Falconer, E. K.	Atlin.	Spruce Creek.
Ford and MacDougall.	Barkerville.	Dragon Creek.
Fowler, Luke.	Hazelton.	Omineca Mining Div.
French Creek Hydraulic Placers, Ltd.	410 Lancaster Bldg., Calgary, Alberta.	Cariboo Dist.
Gold Run Exploration Co., Ltd.	509 Union Bldg., Victoria.	Atlin Dist.
Hagberg, H. A.	Finmore.	Omineca Dist.
Hill, C.	Atlin.	Atlin Dist.
Hixon Creek Gold, Ltd.	473 Howe St., Vancouver.	Cariboo Mining Div.
Hodges & Moran.	Atlin.	Wright Creek.
Huffman, Robt.	Atlin.	Atlin Dist.
Johnson, G.	Atlin.	Spruce Creek.
Keller, E.	Lumberton.	Moyie River.
Kennedy, Wm.	Atlin.	Pine Creek.
Ketch Hydraulic Mine.	Van Winkle.	Devils' Canyon.
Kidson, F. A.	Agassiz.	Fraser River.
Kutchan, Geo.	Horsefly.	Cariboo Dist.
Langevin, D. J.	Box 722, Cranbrook.	Perry Creek.
Larder, Capt. G. S. M.	908 Thurlow, St., Vancouver.	Arrow Lakes.
Le Doux, Eugene.	Quesnel.	Fraser and Parnsip Rivers.
Lykegard, Carl.	Atlin.	Spruce Creek.
Mahaffy, Wm. A.	Brennan Flat via Hudson Hope.	Peace River.
Maley, Len.	Revelstoke.	McCulloch Creek.
Marshall, H. G.	Atlin.	Spruce Creek.
McDonald & Sandstrom Co.	Atlin.	Birch Creek.
McKinnon, Chas. E.	Atlin.	Spruce Creek.
Mew, Ed. L.	914 E. 15th Ave., Vancouver.	Clinton Mining Div.
Morrison and McKay.	Atlin.	Ruby Creek.
Morse, McKechnie & Bratt.	Atlin.	Spruce Creek.
Murphy, Gertrude.	Van Winkle.	Cariboo Mining Div.
Murphy, Nathan.	Atlin.	O'Donnell River.
Northern Reef Gold Mines, Ltd.	704 Bank of Toronto Bldg., Victoria.	McDougall River.
Northern Ventures, Ltd.	Besner Block, Prince Rupert.	Vital Creek.
Nyman, R., and Co.	Atlin.	Atlin Dist.
Perret, F.	Quesnel.	Fraser and Parnsip Rivers.
Pine Creek Mining Co., Ltd.	837 Hastings St., Vancouver.	Pine Creek.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Alluvial Gold Mining Industry—Concluded		
BRITISH COLUMBIA—Concluded		
Placer Engineers, Ltd.	304-535 Georgia St. W., Vancouver	Quesnel Mining Div.
Papich, Tom	Atlin	O'Donnell River.
Porter and Condit.	220 Symons Bldg., Spokane, Wash., U.S.A.	Greenwood, Mining Div.
Powell, Julius	Van Winkle	Cariboo Mining Div.
Queen City Mining Co.	501-1411 4th Ave. Bldg., Seattle, Wash., U.S.A.	Cariboo Mining Div. (a).
Roach, Eli	Skookumchuck	Cariboo Mining Div.
Slade-Cariboo Gold Placers, Ltd.	1410 Hoge Bldg., Seattle, Wash., U.S.A.	Atlin Mining Div.
St. Quentin Mining Co.	Atlin	Peace River Mining Div.
Strandberg, Ludwig	Hudson Hope	Donovan Creek.
Sundberg, Magnus	Windgam	Fort Steele Mining Div.
Suran, A. and J.	Crankbrook	Ashcroft Dist.
Thompson River Dredging Co., Ltd.	163 Hastings St. W., Vancouver	Cariboo Mining Div.
Trehouse Hydraulic Mining Co.	Barkerville	Alin Mining Div.
Turnquist, Emil	Atlin	Liard Mining Div.
Wing, David L.	Box 113, Wrangel, Alaska	Atlin Mining Div.
Woodcann, E. H.	Atlin	
YUKON—		
Holbrook Dredging Co.	Glacier Creek P.O.	Dawson Mining Div.
Inca Mining Co.	Carcross P.O.	Iron Creek.
McCormick and Stewart.	Glacier Creek P.O.	Glacier Creek.
Yukon Consolidated Gold Corp., Ltd.	140 Wellington St., Ottawa, Ont.	Dawson Mining Div.

NOTE.—In addition to the operators listed, there were numerous others from whom official returns were not received.

Principal Operators(x) in Canadian Auriferous Quartz Mining Industry, 1935

NOVA SCOTIA—		
*Avon Gold Mines, Ltd.	407-276 St. James St., Montreal, Que.	Oldham.
*Bennie Gold Mining Co., Ltd.	Middle Musquodoboit.	Moose River Dist.
*Consolidated Mining & Smelting Co. of Canada, Ltd.	215 St. James St. W., Montreal, Que.	Caribou Dist.
Corwin Gold Mines, Ltd.	Oldham	Oldham.
Deal, Andrew	Fairview	Centre Rawdon.
Douglas, L. H.	Caledonia	Queens Co.
Eureka Mines, Ltd.	Malaga	Queens Co.
Foot, C. & G.	75 Chebucto Rd., Halifax	Halifax Co.
Giffin Gold Mines, Ltd.	530 Bank of Hamilton Bldg., Toronto, Ont.	Goldboro.
Gold River Mining Syndicate, Ltd.	Box 715, Halifax	Lunenburg Co.
Guysborough Mines, Ltd.	25 King St. W., Toronto, Ont.	Goldenville.
Higgins & Lawlor	Box 74, Shubenacadia.	Moose River Dist.
Horne, Ed.	Enfield	Hants Co.
Lake Thomas Syndicate, Ltd.	412 Roy Bldg., Halifax	Waverley.
McDonnell, E.	South Uniacke	South Uniacke.
Montague Gold Mines, Ltd.	Box 100, Dartmouth	Halifax Co.
*Montreal Mining Co., Ltd.	Mt. Uniacke	Hants Co.
*Nova Scotia Gold Mines, Ltd.	Tangier	Halifax Co.
*Nugol Mining Corp., Ltd.	85 Richmond St. W., Toronto, Ont.	Lunenburg Co.
Queens Mines, Ltd.	297 Agricola St., Halifax	Mt. Uniacke.
*Salmon River Gold Syndicate	Goldboro	Port Dufferin.
Seal Harbour Gold Mines, Ltd.	5-7 Bloor St. W., Toronto, Ont.	Goldboro.
Thompson, J. H.	Box 98, Oxford	Moose Head.
United Goldfields of Nova Scotia, Ltd.	Liverpool	Queens Co.
QUEBEC—		
*Adanac Gold Mines, Ltd.	601/330 Bay St., Toronto, Ont.	Rouyn.
*Beaufour Mining Corp.	1208 Aldred Bldg., Montreal	Pascal's Tp.
*Anglo-Canada Mineral Explorers	276 St. James St., Montreal	(a).
Arntfield Gold Mines, Ltd.	Arntfield	Beauchastel Tp.
*Ascot Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Malartic and Varsan Tps.
*Astoria Rouyn Mines, Ltd.	70 St. Paul St., Quebec	Rouyn Tp.
*Austin Rouyn Gold Mines, Ltd.	21 King St. E., Toronto, Ont.	Rouyn.
*Avalon Mining Syndicate, Ltd.	67 Yonge St., Toronto, Ont.	Vauquelin Tp.
Beattie Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Duparquet Tp.
*Bidlamaque Gold Mines, Ltd.	713/320 Bay St., Toronto, Ont.	Bidlamaque Tp.
*Blake Chibougamau Mining Corp.	65 St. Anne St., Quebec	Obalski and Mackenzie Tps.
*Birrell Gold Mines, Ltd.	518/371 Bay St., Toronto, Ont.	Duprat Tp.
*Bourchard Clérycy Gold Mines, Ltd.	715 Metropolitan Bldg., Toronto, Ont.	Clérycy Tp.
*Bourbeau Lake Chibougamau Mines, Ltd.	New Liskeard, Ont.	McKenzie Tp.
*Bruell Gold Syndicate, Ltd.	302/330 Bay St., Toronto, Ont.	Vauquelin Tp.
Bussières Mining Co., Ltd.	110/215 St. James St. W., Montreal	Louvicourt Tp.
Canadian Malartic Gold Mines, Ltd.	2800/25 King St. W., Toronto, Ont.	Fournière Tp.
*Canadian Pandora Gold Mines, Ltd.	New Liskeard, Ont.	Cadillac Tp.
*Central Gold Mines, Ltd.	Pictou, Ont.	Dasserat Tp.
*Chieftain Gold Mines, Ltd.	210/26 Queen St. E., Toronto, Ont.	Franquet Tp.
*Chirchill Mining & Milling Co., Ltd.	1206 Central Bldg., 45 Richmond St., Toronto, Ont.	Cadillac Tp.
*Colonial Gold Syndicate, Ltd.	1101 Castle Bldg., Montreal	Dalquier Tp.
*Coniages Reduction Co., Ltd.	510/320 Bay St., Toronto, Ont.	Guillet Tp.
*Cons. Chibougamau Goldfields, Ltd.	276 St. James St., Montreal	Chibougamau Tp.
*Consolidated Mining & Smelting Co. of Canada, Ltd.	215 St. James St. W., Montreal	Chibougamau Dist. and Vauquelin.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators(x) in Canadian Auriferous Quartz Mining Industry, 1935—Continued		
QUEBEC—Concluded		
*Crossroads Gold Mines, Ltd.	c/o McIntosh & McDonald, Continental Life Bldg., Toronto, Ont.	Dubuisson Tp.
*Del Rio Mining Co., Ltd.	506/56 Sparks St., Ottawa, Ont.	Destor Tp.
*Dorrington Mining Syndicate	2408 Stanley St., Niagara Falls, Ont.	Beauchastel Tp.
*Dubuisson Mines, Ltd.	25 King St. W., Toronto, Ont.	Abitibi Dist.
*Duparquet Mining Co., Ltd.	204 Hospital St., Montreal.	Duparquet Tp.
*Duquesne Mines, Ltd.	1305/80 King St. W., Toronto, Ont.	Duparquet and Destor Tps.
*East Malartic Mines, Ltd.	913 Royal Bank Bldg., Montreal.	Fournière Tp.
*Engineers Exploration Co., Ltd.	Box 310, Noranda.	Various.
*Eric Canadian Mines, Ltd.	Box EX, Kirkland Lake, Ont.	Dasserat Tp.
*Fleming Mines, Ltd.	215 St. James St. W., Montreal.	Louvicoourt Tp.
*Fleming-Thompson Mines, Ltd.	Box 308, Rouyn.	Duparquet Tp.
*Florence River Gold Mines, Ltd.	320 Bay St., Toronto, Ont.	Desjardins and Franquet Tps.
*Franoeur Gold Mines, Ltd.	941 Dominion Square Bldg., Montreal.	Boischatel Tp.
*Gains-Moor Gold Mines, Syndicate, Ltd.	411 Transportation Bldg., Montreal.	Guillet Tp.
*Gale Gold Mines, Ltd.	459 Ouellette Ave., Windsor, Ont.	Dubuisson Tp.
*Galatea Gold Mines, Ltd.	1305/80 King St. W., Toronto, Ont.	Duparquet and Destor Tps.
*Garth-Chiboug Gold Syndicate, Ltd.	Canada Permanent Bldg., Toronto, Ont.	McKenzie Tp.
*Granada Gold Mines, Ltd.	Rouyn.	Rouyn.
*Green Stabell Mines, Ltd.	1406/100 Adelaide St. W., Toronto, Ont.	Dubuisson Tp.
*Harriana Amalgamated Gold Mines, Ltd.	220 Grande-Allée, Québec.	Dubuisson and Bourlamaque Tps.
*Inspiration Mining & Dev. Co., Ltd.	Amos.	McKenzie Tp.
*Kirkland-Hudson Bay Mines, Ltd.	New Liskeard, Ont.	Blondeau and Guillet Tps.
*Lacoma Gold Mine, Ltd.	629 Bank of Hamilton Bldg., Toronto, Ont.	Tavernier Tp.
*Lake Fortune Gold Mines, Ltd.	941 Dominion Square Bldg., Montreal.	Boischatel Tp.
*Lamaque Gold Mines, Ltd.	Bourlamaque.	Bourlamaque Tp.
*Lapa Cadillac Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Cadillac Tp.
*La Sarre Gold Mines, Ltd.	314 C.P.R. Bldg., Toronto, Ont.	LaSarre Tp.
*Syndicate Launayor, Ltd.	445 St. François-Xavier, Montreal.	Launay Tp.
*L. B. United Mines, Ltd.	767 Yonge St., Toronto, Ont.	Tibletmont Tp.
*Legault Gold Mines.	Amos.	Dubuisson Tp.
*McDonald Gold Mines, Ltd.	Elmira, Ont.	Duparquet Tp.
*Malartic Goldfields, Ltd.	824 Royal Bank Bldg., Montreal.	Fournière Tp.
*McDonough Mining Syndicate, Ltd.	677 Yonge St., Toronto, Ont.	Various.
*McIntyre Porcupine Mines, Ltd.	Schumacher, Ont.	Guillet Tp.
*McWatters Gold Mines, Ltd.	Box 689, Rouyn.	Rouyn Tp.
*Manley Quebec Gold Mines, Ltd.	304 Bay St., Toronto, Ont.	La Reine Tp.
*Maritime Cadillac Syndicate	Box 173, Moncton, N.B.	Cadillac Tp.
*McKay Exploration, Ltd.	276 St. James St., Montreal.	Chibougamau Tp.
*Midland Mining Corp., Ltd.	231 Notre Dame W., Montreal.	Desmoloizes Tp.
*Mines Development Corp.	189 St. Jean, Quebec.	Tannay and Landrienne Tps.
*Monarch Mines, Ltd.	14 King St. E., Toronto, Ont.	Dasserat Tp.
*Mooshla Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*Murwood Gold Mines, Ltd.	304 Bay St., Toronto, Ont.	Tibletmont Tp.
*Northern Quebec Goldfields and Exploration Co.	Three Rivers.	Bousquet Tp.
*North King Gold Syndicate.	213/414 Bay St., Toronto, Ont.	Haig and Tavernier Tps.
*Nortrac Mining Co., Ltd.	210 St. James St. W., Montreal.	Dalquier Tp.
*Nu Sigma Gold Syndicate, Ltd.	809/465 St. John St., Montreal.	Bourlamaque Tp.
*O'Brien Gold Mines, Ltd.	Kewagama.	Cadillac Tp.
*O'Leary Malartic Mines, Ltd.	Box 120, Noranda.	Various claims.
*O'Neil Thompson Gold Mines, Ltd.	Ottawa, Ont.	Rouyn Tp.
*Pan-Canadian Gold Mines, Ltd.	c/o National Fireworks Inc., West Hanover, Mass., U.S.A.	Cadillac Tp.
*Payore Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Bourlamaque Tp.
*Perron Gold Mines, Ltd.	Perron.	Pascalis Tp.
*Pontiac Rouyn Mines, Ltd.	59 Yonge St., Toronto, Ont.	Rouyn Tp.
*Pre-Cambrian Prospectors, Ltd.	Box 479, Rouyn.	Various.
*Prospectors Airways Co., Ltd.	80 King St. W., Toronto, Ont.	Various.
*Quebec Gold Mining Corp.	110/215 St. James St., Montreal.	Fournière.
*Quebec-Lapauze Gold Mines, Ltd.	409 Notre Dame St. W., Montreal.	LaPauze Tp.
*Renault, Auguste.	Kanagata.	Dasserat Tp.
*Riverside Gold Mines, Ltd.	Rouyn.	Beauchastel Tp.
*Rosco Development Co., Ltd.	210 St. James St. W., Montreal.	Rouyn Tp.
*San Pedro Gold Mining and Prospecting Corp.	6720 Sherbrooke St. E., Montreal.	Tibletmont Tp.
*Sanvar Mines, Ltd.	606/407 McGill St., Montreal.	Siscoe.
*Sigma Mines, Ltd.	Bourlamaque.	Bourlamaque Tp.
*Siscoe Extension Gold Mines, Ltd.	231 St. James St. W., Montreal.	Varsan and Dubuisson Tps.
*Siscoe Gold Mines, Ltd.	907 Dominion Square Bldg., Montreal.	Varsan and Dubuisson Tps.
*Sladen-Malartic Mines, Ltd.	63 Sparks St., Ottawa, Ont.	Fournière Tp.
*South Tibletmont Gold Mines, Ltd.	205/200 Bay St., Toronto, Ont.	Tibletmont Tp.
*Stadacona Rouyn Mines, Ltd.	719 Tramways Bldg., Montreal.	Rouyn Tp.
*Standard Gold Mines, Ltd.	Amos.	Bourlamaque.
*Sullivan Consolidated Mines, Ltd.	1213 Aldred Bldg., Montreal.	Dubuisson Tp.
*Thompson Cadillac Mining Co., Ltd.	1835 Beaver Hall Bldg., Montreal.	Amos.
*Tibletmont Island Mining Co., Ltd.	Senneterre.	Senneterre.
*United Gold Exploration, Ltd.	276 St. James St. W., Montreal.	Laverlochère Tp.
*United Gold Mines, Ltd.	5126 Iberville St., Montreal.	Rouyn Tp.
*Valco Mines Co., Ltd.	8 Sault-au-Matelot, Quebec.	Cadillac and Malartic Tps.
*Val d'Or Mineral Holdings, Ltd.	1406/100 Adelaide St. W., Toronto, Ont.	Various.
*Vieour Gold Mines, Ltd.	Fort Erie, Ont.	Louvicoourt Tp.
*West Shore Malartic Gold Mines, Ltd.	816 Keefer Bldg., Montreal.	Dubuisson and Malartic Tps.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators(x) in Canadian Auriferous Quartz Mining Industry, 1935—Continued		
ONTARIO—		
*Afton Mines, Ltd.	403/217 Bay St., Toronto	Long Lake Dist.
Algold Mines, Ltd.	1206 Central Bldg., Toronto	Goudreau.
Algoma Summit Gold Mines, Ltd.	514 McKinnon Bldg., Toronto	Goudreau.
Anglo-Huronian, Ltd.	80 King St. W., Toronto	Porcupine.
*Arbado Gold Mines, Ltd.	10 Adelaide St. E., Toronto	Matachewan.
Ardeen Gold Mines, Ltd.	132 St. James St. W., Montreal, Que.	Kashabowie.
*Argosy Gold Mines, Ltd.	8 Wellington St. E., Toronto	Dist. of Patricia.
Ashley Gold Mining Corp., Ltd.	350 Bay St., Toronto	Matachewan.
*Atnel Mines, Ltd.	612 Queen St. E., Sault Ste. Marie	Michipicoten.
*Bankfield Gold Mines, Ltd.	1006 Concourse Bldg., Toronto	Geraldton.
Barry-Hollinger Mines, Ltd.	57 Bloor St. W., Toronto	Boston Creek.
Bidgood Kirkland Gold Mines, Ltd.	Kirkland Lake	Lebel Tp.
*Big Master Cons. Gold Mines, Ltd.	112 Yonge St., Toronto	Kenora, M.D.
*Bilmae Gold Mines, Ltd.	364 Bay St., Toronto	Shiningtree.
*Bob Tough Gold Mines, Ltd.	207 Turner Bldg., Hamilton	Lee Valley.
*Bramer Mining, Ltd.	514 McKinnon Bldg., Toronto	Westree.
*Brennan and Kenty Prospecting Co., Ltd.	401/68 King St. E., Toronto	(a)
Buffalo Ankerite Gold Mines, Ltd.	1728 Rand Bldg., Buffalo, N.Y., U.S.A.	S. Porcupine.
*Buffalo-Beardmore Gold Mines, Ltd.	47 Wellington St. E., Toronto	Thunder Bay, M.D.
Canusa Gold Mines, Ltd.	416 Penobscot Bldg., Detroit, Mich., U.S.A.	S. Porcupine.
*Canyon Creek Gold Mines, Ltd.	1108/330 Bay St., Toronto	Shiningtree.
*Casey Contact Gold Mines, Ltd.	1501/67 Yonge St., Toronto	Jellicoe.
*Central Matachewan Mining Corp.	330 Bay St., Toronto	Matachewan.
Central Patricia Gold Mines, Ltd.	1001 Federal Bldg., Toronto	Dist. of Patricia.
*Central Porcupine Mines, Ltd.	1620 Bank of Commerce Bldg., Toronto	Porcupine.
*Cincinnati-Porcupine Mines, Ltd.	1202/302 Bay St., Toronto	Porcupine.
Clark Gold Mines, Ltd.	7411 Delanauddière St., Montreal, Que.	Meglund Tp.
*Clifton Cons. Mines, Ltd.	503/357 Bay St., Toronto	Sturgeon Lake.
Concordia Gold Mining Co., Ltd.	Insurance Exchange Bldg., Montreal, Que.	Porcupine.
Comiaurum Mines, Ltd.	25 King St. W., Toronto	Porcupine.
*Consolidated Mining and Smelting Co. of Canada, Ltd.	215 St. James St., Montreal, Que.	Temagami Cordova Mines.
*Coulson Cons. Gold Mines, Ltd.	1809 Royal Bank Bldg., Toronto	Coulson Tp.
Darwin Gold Mines, Ltd.	304 Bay St., Toronto	Michipicoten.
*Delnite Mines, Ltd.	603 Royal Bank Bldg., Toronto	Porcupine.
Dome Mines, Ltd.	36 Toronto St., Toronto	Porcupine.
Diamond Mining & Exploration Co., Ltd.	Haileybury	Jellicoe.
Duport Mining Co., Ltd.	215 Public Utilities Bldg., Port Arthur	Shoal Lake.
*Edgell Lake Gold Mining Co., Ltd.	Schumacher	Tashota.
Gillies Lake-Porcupine Gold Mines, Ltd.	20/9 Toronto St., Toronto	Porcupine.
Gilmour Gold Mines, Ltd.	409/21 King St. E., Toronto	Hastings Co.
*Golden Arm Mines, Ltd.	Red Lake	Dist. of Patricia.
*Golden Gate Mining Co., Ltd.	59 Yonge St., Toronto	Swastika.
*Golden Summit Mines, Ltd.	2374 Bloor St. W., Toronto	Sesekinika.
*Gomak Mines, Ltd.	1113/320 Bay St., Toronto	Chester Tp.
*Goward Gold Mines, Ltd.	100 Adelaide St. W., Toronto	Thomas and Strathy Tps.
*Grierson Sturgeon River Mines, Ltd.	710 Excelsior Life Bldg., Toronto	Sturgeon Lake.
Halcrow Swayze Mines, Ltd.	1821/25 King St. W., Toronto	Halcrow Tp.
*Hard Rock Gold Mines, Ltd.	603 Royal Bank Bldg., Toronto	Geraldton.
Harkness-Hayes Gold Mines, Ltd.	611 Sterling Tower, Toronto	Schreiber.
*Hillside Gold Mines, Ltd.	Wawa	Michipicoten.
Hollinger Cons. Gold Mines, Ltd.	Timmins	Porcupine and Hislop Tps.
Howey Gold Mines, Ltd.	Red Lake	Red Lake.
*Hudson Patricia Gold Mines, Ltd.	213 Brock Bldg., Toronto	Dist. of Patricia.
*Hutchison Lake Gold Mines, Ltd.	200 Bay St., Toronto	Hutchison Lake.
J. M. Consolidated Gold Mines, Ltd.	1116 Federal Bldg., Toronto	Dist. of Patricia.
*Jellicoe Gold Mining Co., Ltd.	85 Richmond St. W., Toronto	Errington Tp.
*Kaw-Crow Patricia Gold Mines, Ltd.	304 Bay St., Toronto	Dist. of Patricia.
Kenora Prospectors & Miners, Ltd.	25 King St. W., Toronto	Kenora Dist.
*Kirkland Gold Rand, Ltd.	Kirkland Lake	Kirkland Lake.
*Kirkland-Hudson Gold Mines, Ltd.	Box 700, New Liskeard	Kirkland Lake.
Kirkland Lake Gold Mining Co., Ltd.	930 Canadian Bank of Commerce Bldg., Toronto	Kirkland Lake.
*La Fond Gold Mines, Ltd.	701 Excelsior Life Bldg., Toronto	Skead Tp.
*Lake Caswell Mines, Ltd.	1465 Yonge St., Toronto	Shiningtree.
Lake Shore Mines, Ltd.	Kirkland Lake	Kirkland Lake.
*L. B. United Mines, Ltd.	767 Yonge St., Toronto	Dist. of Algoma.
*Leitch Gold Mines, Ltd.	1213/320 Bay St., Toronto	Thunder Bay Dist.
Little Long Lac Gold Mines, Ltd.	25 King St. W., Toronto	Geraldton.
Lucky Coon Mine (R. Cone)	Mine Centre.	Mine Centre.
*Macandrew Red Lake Gold Mines, Ltd.	100 Adelaide St. W., Toronto	Dist. of Patricia.
Macassa Mines, Ltd.	85 Richmond St. W., Toronto	Kirkland Lake.
Mac-Auer Gold Mines, Ltd.	105 University Tower, Montreal, Que.	Crerar.
*Macjoe Sturgeon Gold Mines, Ltd.	67 Yonge St., Toronto	Jellicoe.
*MacLeod-Cockshutt Gold Mines, Ltd.	1001/85 Richmond St. W., Toronto	Geraldton.
*Madsen Red Lake Gold Mines, Ltd.	67 Yonge St., Toronto	Dist. of Patricia.
*Magnet Lake Gold Mines, Ltd.	1005 Federal Bldg., Toronto	Errington Tp.
*Magwell Long Lac Gold Mines, Ltd.	465 Bay St., Toronto	Long Lac Dist.
Marbuan Gold Mines, Ltd.	1728 Rand Bldg., Buffalo, N.Y., U.S.A.	Porcupine.
Matachewan Cons. Mines Ltd.	25 King St. W., Toronto	Matachewan.
*McDonough Mining Syndicate, Ltd.	67 Yonge St., Toronto	(a)
McIntyre Porcupine Mines, Ltd.	Schumacher	Porcupine.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators(x) in Canadian Auriferous Quartz Mining Industry, 1935—Continued		
ONTARIO—Concluded		
McKenzie Red Lake Gold Mines, Ltd.	507 National Bldg., Toronto	Dist. of Patricia.
McLaren-Porcupine Gold Mines, Ltd.	Box 907, South Porcupine.	Porcupine.
McMartin, J. Bruce	Jellicoe.	Jellicoe.
McMillan Gold Mines, Ltd.	Sudbury.	Mongowin Tp.
Miller Independence Mines, Ltd.	c/o M. G. Hunt, Kirkland Lake	Boston Creek.
*Milmac Mines, Ltd.	612 Queen St. E., Sault Ste. Marie.	Michipicoten.
Minto Gold Mines, Ltd.	Wawa.	Michipicoten.
Moffat-Hall Mines, Ltd.	Haileybury.	Kirkland Lake.
*Morris Kirkland Gold Mines, Ltd.	Kent Bldg., Toronto.	Kirkland Lake.
Naybob Gold Mines, Ltd.	Timmins.	Porcupine.
*New Golden Rose Mines, Ltd.	806/302 Bay St., Toronto.	Temagami.
Northern Empire Mines Co., Ltd.	Empire.	Empire.
*Northern Canada Mining Corp., Ltd.	68 King St. W., Toronto.	Long Lac Dist.
North Shore Gold Mines, Ltd.	1022 Federal Bldg., Toronto.	Schreiber.
*Omega Gold Mines, Ltd.	15 King St. W., Toronto.	Larder Lake.
*Oro Plata Mining Co., Ltd.	85 Richmond St. W., Toronto.	Various.
*Pamour Porcupine Mines, Ltd.	215 St. James St. W., Montreal, Que.	Porcupine.
Parkhill Gold Mines, Ltd.	1835 Beaver Hall Bldg., Montreal, Que.	Michipicoten.
Paymaster Cons. Mines, Ltd.	South Porcupine.	Porcupine.
Pickle Crow Gold Mines, Ltd.	1406 Concourse Bldg., Toronto.	Dist. of Patricia.
*Plymouth Gold Mining Co., Ltd.	605 Insurance Exchange Bldg., Montreal, Que.	Rainy River Dist.
*Porcupine Peninsular Gold Mines, Ltd.	80 King St. W., Toronto.	Cody and Macklem Tps.
Red Crest Gold Mines, Ltd.	Phillips Square, Montreal, Que.	Red Lake.
*Red Lake Gold Shore Mines, Ltd.	244 Bay St., Toronto.	Red Lake.
*Rickard Ramore Gold Mines, Ltd.	601 Concourse Bldg., Toronto.	Rickard Tp.
*Rich Rock Gold Mines, Ltd.	902 Star Bldg., Toronto.	Lennox and Addington Cos.
*Roche Long Lac Gold Mines, Ltd.	372 Bay St., Toronto.	Little Long Lac Dist.
*Sand River Gold Mining Co., Ltd.	1116 Federal Bldg., Toronto.	Sturgeon River area.
St. Anthony Gold Mines, Ltd.	159 Bay St., Toronto.	Sturgeon Lake.
S. B. Smith Mine.	Goldpark.	Goldpark.
*Schreiber Pyramid Gold Mines, Ltd.	372 Bay St., Toronto.	Schreiber.
Sol d'Or Gold Mines, Ltd.	505/140 Wellington St., Ottawa.	Narrow Lake.
*Shiningtree Gold Mines, Ltd.	32 Imperial Bank Bldg., Toronto.	Shiningtree area.
*South Shore Gold Syndicate.	67 Yonge St., Toronto.	Porcupine.
*Split Lake Gold Mines, Ltd.	1104 Bank of Hamilton Bldg., Toronto.	Split Lake.
*Straw Lake Beach Gold Mines, Ltd.	67 Yonge St., Toronto.	Emo.
*Supreme Gold Mines, Ltd.	314 Metropolitan Bldg., Toronto.	Sturgeon Lake.
Sylvanite Gold Mines, Ltd.	Kirkland Lake.	Kirkland Lake.
Tashota Goldfields, Ltd.	Tashota.	Tashota.
Tellaurum Gold Mines, Ltd.	Box 341, Haileybury.	Matheson.
Teck-Hughes Gold Mines, Ltd.	Kirkland Lake.	Kirkland Lake.
Toburn Gold Mines, Ltd.	217 Bay St., Toronto.	Kirkland Lake.
*Vanguard Long Lac Gold Mines, Ltd.	710 Excelsior Bldg., Toronto.	Little Long Lac.
Vermillion Operating Co.	Sioux Lookout.	Vermillion Tp.
*Wells Long Lac Mines, Ltd.	347 Bay St., Toronto.	Thunder Bay Dist.
*Wendigo Gold Mines, Ltd.	701 Dominion Bank Bldg., Toronto.	Lake of Woods.
*Wilport Gold Mines, Ltd.	347 Bay St., Toronto.	Beardmore.
Wright-Hargreaves Mines, Ltd.	Fort Erie.	Kirkland Lake.
Young Davidson Mines, Ltd.	Timmins.	Matachewan.
MANITOBA—		
*Brooks God's Lake Gold Mines, Ltd.	726 Bank of Hamilton Bldg., Toronto, Ont.	God's Lake.
*Canadian Minerals, Ltd.	611 Paris Bldg., Winnipeg.	Various.
Central Manitoba Mines, Ltd.	308 Paris Bldg., Winnipeg.	Wadhope.
*Cons. Goldfields of Manitoba, Ltd.	941 Somerset Block, Winnipeg.	Rice Lake Dist.
Diana Gold Mines, Ltd.	67 Yonge St., Toronto, Ont.	Rice Lake Dist.
Forty Four Mines, Ltd.	237 Curry Bldg., Winnipeg.	Rice Lake Dist.
*Gabrielle Mines, Ltd.	903 McArthur Bldg., Winnipeg.	Rice Lake Dist.
*Gunner Gold Mines, Ltd.	2001 Star Bldg., Toronto, Ont.	Bersford Lake.
Gurney Gold Mines, Ltd.	341 Grain Exchange Bldg., Winnipeg.	The Pas, Mining Div.
God's Lake Gold Mines, Ltd.	395 Main St., Winnipeg.	God's Lake.
Hackett Gold Mining Co., Ltd.	The Pas.	Herb Lake.
Island Lake Mines, Ltd.	Hamilton Bldg., Winnipeg.	Island Lake.
*Jowsey Island Gold Mines, Ltd.	395 Main St., Winnipeg.	God's Lake.
Knee Lake Gold Mines, Ltd.	306 Main St., Winnipeg.	Knee Lake.
*Laguna Gold Mines, Ltd.	350 Bay St., Toronto, Ont.	Herb Lake.
*Little God's Lake Syndicate, Ltd.	1116 Federal Bldg., Toronto, Ont.	God's Lake area.
*Mandalay Gold Mines, Ltd.	207 Avenue Block, Winnipeg.	Rice Lake Mining Div.
*Packsack Mines, Ltd.	306 Main St., Winnipeg.	Rice Lake Mining Div.
*Ranger Gold Mines, Ltd.	941 Somerset Block, Winnipeg.	Rice Lake Mining Div.
San Antonio Gold Mines, Ltd.	237 Curry Bldg., Winnipeg.	Rice Lake Mining Div.
*Stevenson Lake Gold Mines, Ltd.	306 Main St., Winnipeg.	Stevenson Lake.
Vanson Manitoba Gold Mines, Ltd.	209 Bank of Nova Scotia Bldg., Winnipeg.	Rice Lake Mining Div.
SASKATCHEWAN—		
*Athabasca Beaverlodge Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Lake Athabaska.
*Athona Mines, Ltd.	244 Bay St., Toronto, Ont.	Lake Athabaska.
*Athabasca Portal Gold Mines, Ltd.	710 Excelsior Life Bldg., Toronto, Ont.	Lake Athabaska.
*Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail, B.C.	Lake Athabaska.
*Flin Flon Mining Syndicate, Ltd.	310 Avenue Block, Winnipeg.	Douglas Lake.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators(x) in Canadian Auriferous Quartz Mining Industry, 1935—Continued		
BRITISH COLUMBIA—		
Aboo Mines, Ltd.	210/602 Hastings St. W., Vancouver	Clayoquot Mining Div.
Ashloo Gold Mining Syndicate	411 Bank of Nova Scotia Bldg., Vancouver	Squamish.
Bayonne Cons. Mines, Ltd.	1007 Royal Bank Bldg., Vancouver	Tye.
*Blue Hawk Gold Mines Syndicate	2083 Byron St., Victoria	Vernon, Mining Div.
*Bonanza Cache Gold Mines, Ltd.	736 Granville St., Vancouver	Lillooet Mining Div.
Bralorne Mines, Ltd.	555 Burrard St., Vancouver	Lillooet Mining Div.
*B. R. X. Gold Mines, Ltd.	616 Stock Exchange Bldg., Vancouver	Bridge River.
*Buena Vista Mining Co., Ltd.	Trail.	Stewart.
Campbell, S. F.	Smithers.	Omineca Mining Div.
Cariboo Gold Quartz Mining Co., Ltd.	615 Bower Bldg., Vancouver	Wells.
Clubine Comstock Gold Mines, Ltd.	Box 1091, Nelson	Salmo.
*Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail.	Portland Canal Mining Div.
Danzig Mines Inc.	806/37 Avenue "D", Seattle, Wash., U.S.A.	Nootka.
Dentonia Mines, Ltd.	706 Credit Foncier Bldg., Vancouver	Greenwood Mining Div.
*Dictator Gold Mines, Ltd.	304/1030 Georgia St. W., Vancouver	Greenwood Mining Div.
*Durango Gold Mines, Ltd.	Yorkshire Bldg., Vancouver	Nelson Mining Div.
Evening Star Syndicate	Rossland.	Rossland.
*Fairview Amalgamated Gold Mine, Ltd.	208 Pacific Bldg., Vancouver	Osoyoos Mining Div.
*Fawn Mining Co., Ltd.	808 Pender St. W., Vancouver	Nelson Mining Div.
Franklin River Gold Mines	615/402 Pender St. W., Vancouver	Alberni Canal.
Fried, A. O., and Penney, M.	Rossland.	Trail Creek Mining Div.
*Gem Gold Mines, Ltd.	36/955 Thurlow St., Vancouver	Texada Island.
*Gold Belt Mining Co., Ltd.	616 Stock Exchange Bldg., Vancouver	Nelson Mining Div.
*Gold Fern Mines, Ltd.	72 Queen St. W., Toronto, Ont.	Nelson Mining Div.
*Golden Eagle Mines, Ltd.	826 Birks Bldg., Vancouver	Hedley.
Gornmley, G. T., & Sons.	Nelson.	Nelson Mining Div.
Granby Consolidated Mining, Smelting & Power Co., Ltd.	789 Pender St. W., Vancouver	Nass River Mining Div.
Grandoro Mines, Ltd.	102 Pacific Bldg., Vancouver	Osoyoos Mining Div.
Grange Mines, Ltd.	831 Marine Bldg., Vancouver	Clinton.
*Hedley Mascot Gold Mines, Ltd.	110 Water St., Vancouver	Osoyoos Mining Div.
Henderson, Geo.	Slocan City	Kootenay Dist.
Island Mt. Mines Co., Ltd.	Wells.	Cariboo Mining Div.
I. X. L. Leasors, Ltd.	Rossland.	Trail Creek Mining Div.
Kerr, James	Carmi.	Greenwood Mining Div.
*Kimberley Goldfields Cons., Ltd.	Hanson Block, Crambrook	Fort Steele Mining Div.
Kootenay Belle Gold Mines, Ltd.	708 Yorkshire Bldg., Vancouver	Nelson Mining Div.
Legisti, R.	510 Hastings St. W., Vancouver	Carmi.
Kelowna Exploration Co., Ltd.	Hedley	Osoyoos Mining Div.
Livingstone Mining Co. Inc.	Blewett	Kootenay Mining Div.
Loughborough Gold Mines, Ltd.	222 Rogers Bldg., Vancouver	Vancouver Mining Div.
*Lytton Gold Mines, Ltd.	1110 E. 15th Ave., Vancouver	Lytton.
MacInnes, Geo. L.	413 Granville St., Vancouver	Lillooet.
Mak Siccar Gold Mines, Ltd.	Box 1013, Vancouver	Similkameen.
*Martel Gold Mines, Ltd.	607 Standard Bank Bldg., Vancouver	Ashcroft Mining Div.
McArthur, W. E., Jr.	Box 629, Greenwood	Greenwood Mining Div.
McCarthy, James F.	Grand Forks.	Grand Forks.
Midnight Syndicate	Rossland.	Rossland.
Minto Gold Mines, Ltd.	Minto Mine.	Bridge River.
Morning Star Gold Mines, Ltd.	25 Howe St., Vancouver	Osoyoos Mining Div.
Mullen, J. F.	Juneau, Alaska	Taku River.
Munro, P. M.	Slocan City	Slocan City.
*National Gold Mines, Ltd.	502 Pacific Bldg., Vancouver	MacGillivray Falls.
*Nicholson Creek Mining Corp.	700 Insurance Bldg., Seattle, Wash., U.S.A.	Omineca Mining Div.
Noble Five Mines, Ltd.	Nelson.	Nelson Mining Div.
O. K. Leasing Co.	Box 167, Rossland.	Rossland.
Olalla Gold Mines, Ltd.	417 Vancouver Block, Vancouver	Osoyoos Mining Div.
Oscarson Bros.	Erie.	Nelson Mining Div.
Osoyoos Mines, Ltd.	Bank of Toronto Bldg., Calgary, Alberta	Osoyoos Mining Div.
*Pacific Eastern Gold, Ltd.	304 Pacific Bldg., Vancouver	Lillooet Mining Div.
Patterson, Frank	Refuge Bay	Skeena Mining Div.
*Perrier Gold Mines, Ltd.	Nelson.	Nelson Mining Div.
Pickering, B. A.	Box 857, Nelson	Nelson Mining Div.
*Pilot Gold Mines, Ltd.	5/410 Seymour St., Vancouver	Lillooet Mining Div.
Pioneer Gold Mines of B.C., Ltd.	605 Rogers Bldg., Vancouver	Lillooet Mining Div.
Pre Cambrian Gold Mines	1319 Smith Tower, Seattle, Wash., U.S.A.	Ewings Landing.
Premier Gold Mining Co., Ltd.	Royal Trust Bldg., Vancouver	Portland Canal Mining Div.
Relief-Arlington Mines, Ltd.	Erie.	Erie.
Reno Gold Mines, Ltd.	Yorkshire Bldg., Vancouver	Nelson Mining Div.
Riegel Mines, Ltd.	Grand Forks.	Grand Forks Mining Div.
*Salmo-Malartic Mines, Ltd.	159 Bay St., Toronto, Ont.	Nelson Mining Div.
*Salmon Gold Mines, Ltd.	800 Hall Bldg., Vancouver	Portland Canal Mining Div.
Santiago Mines, Ltd.	3690 Selkirk Ave., Vancouver	Phillips Arm.
Sheep Creek Gold Mines, Ltd.	616 Stock Exchange Bldg., Vancouver	Nelson Mining Div.
Surf Inlet Cons. Gold Mines, Ltd.	3857 Pt. Grey Rd., Vancouver	Surf Inlet.
Timmins, N. A., Corp.	1010 Canada Cement Bldg., Montreal, Que.	Porcher Island.
*Trites Gold Mining Co., Ltd.	744 Hastings St. W., Vancouver	Ymir.
*Tyee Cons. Mining Co., Ltd.	475 Howe St., Vancouver	Vancouver Island.
Ural Mine	Box 389, Trail	Trail.
Vancouver Island Gold Mines, Ltd.	854 Dunsmuir St., Vancouver	Alberni Mining Div.
Velvet Gold Mining Co.	5001-1st Ave. S., Seattle, Wash., U.S.A.	Rossland.
Vidette Gold Mines, Ltd.	404 Pacific Bldg., Vancouver	Savona.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators(x) in Canadian Auriferous Quartz Mining Industry, 1935—Concluded		
BRITISH COLUMBIA—Concluded.		
Wayside Cons. Gold Mines, Ltd.....	Wayside, Bridge River.....	Bridge River Dist.
*Wesko Mines, Ltd.....	Box 544, Nelson.....	W. Kootenay.
Wilcox Mining Syndicate.....	Ymir.....	Ymir.
Windpass Gold Mining Co., Ltd.....	608 Pacific Bldg., Vancouver.....	North Thompson area.
Wooman, Max & Partners.....	Rossland.....	Rossland.
Ymir Cons. Gold Mines, Ltd.....	601 Lumberman's Bldg., Vancouver.....	Ymir.
Ymir Dundee Gold Mining Co., Ltd.....	Box 246, Nelson.....	Ymir.
Ymir Yankee Girl Gold Mines, Ltd.....	Ymir.....	Ymir.
Young, Wm. (Roadside Mine).....	Cranberry Lake.....	Lund.
YUKON AND NORTHWEST TERRITORIES—		
Burwash Yellowknife Mines, Ltd.....	1112/85 Richmond St., W., Toronto, Ont.....	Great Slave area.
*Carmacks Mining Syndicate.....	Carmacks, Y. T.....	Carmacks.
Slave Lake Gold Mines, Ltd.....	601/244 Bay St., Toronto, Ont.....	Great Slave area.
*Yukon Cons. Gold Corp., Ltd.....	140 Wellington St., Ottawa, Ont.....	Carmacks.

Operators in Canadian Copper-Gold-Silver Mining Industry, 1935

QUEBEC—		
*Bagamac Rouyn Mines, Ltd.....	Haileybury, Ont.....	Rouyn Tp.
Consolidated Copper and Sulphur Co.....	Eustis.....	Eustis.
*James Patrice Gold Mines, Ltd.....	Rouyn.....	Guerin Tp.
*Joannes Mine Corp., Ltd.....	276 St. James St. W., Montreal, Que.....	Joannes Tp.
*La Compagnie Minière d'Amos, Ltée.....	1410 Stanley St., Montreal.....	Dalquier Tp.
*Lake Dore Mines, Ltd.....	1001 Federal Bldg., Toronto, Ont.....	Chibougamau area.
Noranda Mines, Ltd.....	804 Royal Bank Bldg., Toronto, Ont.....	Rouyn Tp.
*Normetal Mining Corp., Ltd.....	602/350 Bay St., Toronto, Ont.....	Desmeloizes Tp.
*Opemiski Copper Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Levy Tp.
Robb-Montbray Mines, Ltd.....	1001/85 Richmond St. W., Toronto, Ont.....	Montbray Tp.
MANITOBA AND SASKATCHEWAN—		
Hudson Bay Mining & Smelting Co., Ltd.....	404 Dundas St., Woodstock, Ont.....	Flin Flon.
Sherritt Gordon Mines, Ltd.(d).....	25 King St. W., Toronto, Ont.....	Sheridon, Man.
BRITISH COLUMBIA(c)—		
Britannia Mining & Smelting Co., Ltd.....	Britannia Beach.....	Britannia Beach.
Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Rossland.
Granby Consolidated Mining, Smelting & Power Co., Ltd.(b).....	789 West Pender St., Vancouver.....	Anyox.
Jumbo Leasing Syndicate.....	Box 105, Rossland.....	Trail Creek.
*Sunloch Mines, Ltd.....	Trail.....	Jordan River.

Chrome Ore Mining Industry

QUEBEC—		
Asbestos Corporation, Ltd.....	Canada Cement Bldg., Montreal.....	Thetford Mines.
Product—Chromite.		
Plante, P. & Bros.....	Ste. Angele de Merici.....	Arvantgish Tp.
Product—Chromite.		
ONTARIO—		
Chromium Mining & Smelting Corp., Ltd.....	Bank of Commerce Bldg., Hamilton.....	Collins.
Product—Chromite and ferrochrome.		

Manganese Mining Industry

NOVA SCOTIA—		
Atlantic Manganese Corp., Ltd.(*).....	Roy Bldg., Halifax.....	New Ross.
Product—Manganese ore.		
NEW BRUNSWICK—		
Casey, Harry E.....	173 Weldon St., Moncton.....	Turtle Creek.
Product—Manganese ore.		

(a) Information not available.

(b) Now out of business.

(c) In addition to the companies listed, there were numerous operators working under lease on the LeRoy, Centre Star and other mines.

(*) Active but not producing.

(x) In addition to the operators listed, there were numerous active properties for which official returns were not received.

(d) Idle in 1935 but operated in 1936.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Molybdenite Mining Industry		
QUEBEC— Bain, J. Estate*..... Product—Molybdenite.	c/o Toronto General Trusts Corp. Ottawa, Ontario.	Hull Co.
Madore and Germain*..... Product—Molybdenite.	4321A. Breboeuf St., Montreal.....	Portneuf.
ONTARIO— Dukes, A. V. (*)..... Product—Molybdenite.	Mace.....	Steel Tp.
The Phoenix Molybdenite Corp., Ltd. (*)..... Product—Molybdenite.	36 Toronto St., Toronto.....	Renfrew Co.
BRITISH COLUMBIA— Nicholson Creek Mining Corp.*.....		Usk.
Nickel-Copper Mining Industry		
ONTARIO— Cuniptau Mines, Ltd..... Falconbridge Nickel Mines, Ltd.....	465 Bay St., Toronto..... 25 King St. W., Toronto.....	Strathy Tp. Falconbridge Tp.
International Nickel Company of Canada, Ltd.....	Copper Cliff.....	Copper Cliff, Coniston and Port Colborne.
BRITISH COLUMBIA— B. C. Nickel Mines, Ltd. (*).....	510 W. Hastings St., Vancouver.....	Choate.
Non-Ferrous Smelting and Refining Industry		
Copper Smelting Companies		
Noranda Mines, Ltd..... International Nickel Co., of Canada, Ltd.....	2 King St. E., Toronto, Ontario..... 67 Wall St., New York City, U.S.A.....	Noranda. Copper Cliff, Coniston and Port Colborne.
†Falconbridge Nickel Mines, Ltd..... Hudson Bay Mining & Smelting Co., Ltd..... Granby Consolidated Mining, Smelting & Power Co., Ltd. (a).....	25 King St. W., Toronto, Ontario..... 404 Dundas St., Woodstock, Ontario..... 789 Pender St. W., Vancouver, B.C.....	Falconbridge. Flin Flon. Anyox.
(*) Active but not producing. † Smelt nickel-copper ores and produce platinum and other precious metals. (a) Smelting operations suspended in 1935.		
Electrolytic Copper Refining Companies		
Canadian Copper Refiners, Ltd. (c)..... Ontario Refining Co., Ltd. (c).....	2 King St. E., Toronto, Ont..... Copper Cliff, Ont.....	Montreal East, Que. Copper Cliff, Ont.
(c) Also produced refined silver, tellurium and selenium.		
Lead Smelting and Refining Company		
Consolidated Mining and Smelting Co., of Canada, Ltd. (*).....	215 St. James St. W., Montreal, Que.....	Trail, B.C.
(*) Produce bismuth or bismuth-bearing bullion as by-products.		
Electrolytic Zinc Refining Companies		
Consolidated Mining and Smelting Co., of Canada, Ltd..... Hudson Bay Mining and Smelting Co., Ltd.....	215 St. James St. W., Montreal, Que..... 404 Dundas St., Woodstock, Ont.....	Trail, B.C. Flin Flon, Man.
(*) Also produce Cadmium.		
Smelter and Refiner of Cobalt-Silver-Arsenic Ores		
Deloro Smelting and Refining Co., Ltd. (*).....	Deloro, Ont.....	Deloro, Ont.
(*) Also produce bismuth.		

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Refiner of Uranium-Radium Ores		
Eldorado Gold Mines, Ltd.....	Star Bldg., Toronto, Ont.....	Port Hope, Ont.
Producer of Primary Aluminium		
Aluminum Company of Canada, Ltd.....	Canada Life Bldg., Toronto, (2), Ont.....	Arvida and Shawinigan Falls Que.
Smelter of Chromium Ores		
Chromium Mining and Smelting Corp.....	Bank of Commerce Bldg., Hamilton, Ont...	Sault Ste. Marie, Ont.
Producers of Platinum Metals(*)		
Cuniptau Mines Ltd.....	465 Bay St., Toronto.....	Strathy Tp., Ont.
International Nickel Co. of Canada, Ltd.....	Copper Cliff, Ont.....	Acton, England.
Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Kristiansand, Norway.

(*) In addition to the companies listed, there are usually individual miners reporting the recovery of small quantities of alluvial platinum from streams in British Columbia.

Silver-Cobalt Mining Industry†

Agnico Mines.....	Box 61, Haileybury, Ont.....	South Lorrain.
Bellorain Mines, Ltd.....	Box 206, Cobalt, Ont.....	South Lorrain.
Brewer, R.....	Cobalt, Ont.....	Cobalt.
Cobalt Properties, Ltd.....	Box 929, Cobalt, Ont.....	Cobalt.
Connor Silver Mines, Ltd.....	276 St. James St. W., Montreal, Que.....	North Cobalt.
Comet Leasing Co.....	Box 170, Kirkland Lake, Ont.....	Coleman Tp.
Dean and Downey.....	Box 616, Cobalt, Ont.....	South Lorrain.
Hudson Bay Mines, Ltd.....	Box 700, New Liskeard, Ont.....	Coleman Tp.
Martin, Geo.....	Box 659, Cobalt, Ont.....	Coleman Tp.
McCready and Press.....	Box 130, Cobalt, Ont.....	Coleman Tp.
Miller, H. G.....	Silver Centre, Ont.....	South Lorrain.
Morganthaler, A. G.....	2108 S. 2nd St., Philadelphia, Pa., U.S.A.....	Coleman Tp.
Morrison Mines, Ltd.....	165 Sparks St., Ottawa, Ont.....	Gowganda Dist.
Mosher, Richardson & Lafarge.....	Cobalt, Ont.....	Cobalt.
Nipissing Mining Co., Ltd.....	Excelsior Life Bldg., Toronto, Ont.....	Cobalt.
O'Brien, M. J., Ltd.....	Victoria Chambers, Ottawa, Ont.....	Gowganda Dist. and Cobalt.
O'Donald, John C.....	Box 286, Cobalt, Ont.....	Coleman Tp.
Price, C. W.....	Box 388, Cobalt, Ont.....	Coleman Tp.
Rowe and Stuckey.....	Cobalt, Ont.....	South Lorrain.
Sandoe and Moyle.....	Box 362, Cobalt, Ont.....	Coleman Tp.
Silver Cliff Syndicate.....	Cobalt, Ont.....	Cobalt.
Silverado Gowganda Mines, Ltd.....	347 Bay St., Toronto, Ont.....	Gowganda.
Sirola, Donald E.....	Box 169, Cobalt, Ont.....	Coleman Tp.
Thornham, J.....	Box 385, Cobalt, Ont.....	South Lorrain.
Yorkshire Cobalt Mining Co.....	Cobalt, Ont.....	Bucke Tp.
Wood, A.....	c/o T. Lindsley, 25 King St. W., Toronto, Ont.....	Cobalt.

(†) All properties located in Ontario.

Silver-Lead-Zinc Mining Industry

NOVA SCOTIA—		
(*) The British Metal Corporation (Canada), Ltd.....	Dominion Square Bldg., Montreal, Que.....	Richmond Co.
QUEBEC—		
(*) Federal Zinc and Lead Co., Ltd.....	608 Drummond Bldg., Montreal.....	Gaspe Co.
(*) Lyall and Beidelman.....	608 Drummond Bldg., Montreal.....	Gaspe Co.
Tetreault, Pierre, Estate of.....	70 Holyrood Ave., Montreal.....	Montauban les Mines.
BRITISH COLUMBIA—		
Ainslie, Roy F.....	Slocan City.....	Slocan City Mining Div.
(*) Allico Silver Mines, Ltd.....	708 Yorkshire Bldg., Vancouver.....	W. Kootenay Mining Div.
Base Metals Mining Corp., Ltd.....	350 Bay St., Toronto, Ont.....	Golden Mining Div.
Beaverdell Wellington Syndicate, Ltd.....	Greenwood.....	Greenwood Mining Div.
Beaver Silver Mines, Ltd.....	708/525 Seymour St., Vancouver.....	Greenwood Mining Div.
Bell Mine, Ltd.....	Box 464, Penticton.....	Beaverdell.
Black Colt Leasers.....	Box 371, New Denver.....	Sandon.
Bombini, S.....	Greenwood.....	Grand Forks Mining Div.
(*) Brown and Curwen.....	Ymir.....	Ymir.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Silver-Lead-Zinc Mining Industry—Concluded		
BRITISH COLUMBIA—Concluded		
Clements, Wm.	Slocan	Slocan Mining Div.
Consolidated Mining and Smelting Co. of Canada, Ltd.	C.P.R. Bldg., Montreal, Que.	Kimberley.
Cunningham Mines, Ltd.	Alamo	Sandon.
Davidson, L. S.	Stewart	Glacier Creek Area.
Doney, E.	Box 17, Sandon	Slocan.
Dunwell Syndicate	Stewart	Stewart.
Campbell, Colin J.	New Denver	Slocan Mining Div.
Dunwell Mines, Ltd.	101 Pemberton Bldg., Victoria	Stewart.
Erickson, A.	Silverton	Slocan Dist.
Ewing, A. G.	Slocan City	Slocan Dist.
Excelsior Prospecting Syndicate, Ltd.	548 Bastion St., Victoria	Portland Canal Dist.
Falconer, T. W.	Alice Arm.	Naas River Mining Div.
Fanchin, Joe.	Sandon	Slocan Dist.
Farnham, J., & Co.	Slocan	Slocan Dist.
Fife, H. L.	Slocan	Slocan Dist.
Fisher Maiden Mining Co., Ltd.	1024/20th Ave., Spokane, Wash., U.S.A.	Silverton.
Galena Farm Cons. Mines, Ltd.	615 Stock Exchange Bldg., Vancouver	Silverton.
Greenwood, Wm.	Slocan City	Slocan City Dist.
Henderson, Geo.	Slocan City	Slocan City Dist.
Highland Lass, Ltd.	Box 782, Kelowna	Greenwood, Mining Div.
(*) Invermay Annex Mining Co., Ltd.	828 W. Hastings St., Vancouver	Yale Dist.
Jackson Mines, Ltd.	616 Stock Exchange Bldg., Vancouver	Silverton.
Jarvis, A.	Silverton	Silverton.
Jenny Long Gold Mines	914 Hall Bldg., Vancouver	Stump Lake.
Kamloops Homestake Mines, Ltd.	902/475 Home St., Vancouver	Kamloops Mining Div.
Lakeview Mine	Sandon	Nelson Mining Div.
McArthur, W. E.	Box 629, Greenwood	Greenwood Mining Div.
Meridian Mining Co., Ltd.	555 Howe St., Vancouver	Cam borne.
Michael Silver Lead Mines, Ltd.	c/o L. A. Read, Trail	Nelson Mining Div.
Molly Hughes Mining Co.	New Denver	Slocan Dist.
Nicola Mines & Metals, Ltd.	1015 Rogers Bldg., Vancouver	Nicola Mining Div.
Noble Five Mines, Ltd.	Nelson	Sandon.
Nordnan, J. L.	Beaverdell	Beaverdell.
Northwestern Aerial Prospectors, Ltd.	Victoria	Stewart.
O'Neil, B. E.	Slocan City	Slocan City Mining Div.
Reco Mining & Milling Co., Ltd.	Sandon	Slocan City Mining Div.
Roberts, W. R.	Silverton	Slocan Dist.
Ross Mining Syndicate, Ltd.	Nelson	Retallack, Rambler Sta.
Ruth-Hope Mining Co., Ltd.	616 Stock Exchange Bldg., Vancouver	Sandon.
Sally Mines, Ltd.	Box 220, Penticton	Greenwood Mining Div.
Spiers, S. A. & Co.	Slocan	Three Forks.
Stevenson and Johanson	Sandon	Invermere.
(*) Thunderbird Mines, Ltd.	c/o E. C. Wragge, Nelson	Kalro.
Utica Mines, Ltd.	415 Bank of Nova Scotia Bldg., Vancouver	Greenwood Mining Div.
Waterloo Gold Mines, Ltd.	Penticton	Silverton.
Western Exploration Co., Ltd.	Silverton	Greenwood
White, Geo.	Greenwood	Greenwood
YUKON—		
Formo, H. E.	1045 Pacific St., Vancouver, B.C.	Mayo Dist.
Gordon, Alex.	Keno, Yukon Territory	Mayo Dist.
(*) Treadwell Yukon Co., Ltd.	920 Crocker Bldg., San Francisco, California, U.S.A.	Mayo Dist.
NORTHWEST TERRITORIES—		
(*) Bear Exploration and Radium, Ltd.	1112/85 Richmond St. W., Toronto, Ont.	Great Bear Lake Dist.
Consolidated Mining and Smelting Co. of Canada, Ltd.	C. P. R. Bldg., Montreal, Que.	Great Bear Lake Dist.
El-Bonanza Mining Corp., Ltd.	2001 Star Bldg., Toronto, Ont.	Great Bear Lake Dist.
Eldorado Gold Mines, Ltd.	2001 Star Bldg., Toronto, Ont.	Great Bear Lake Dist.
(*) White Eagle Silver Mines, Ltd.	1006 Concourse Bldg., Toronto, Ont.	Camsell River.

(*) Operating but not producing.

NOTE.—Operators listed under the Northwest Territories are essentially producers of silver or silver-pitchblende ores. Based on the value of the gold content of their ores, some important silver-lead producers are classified as gold mines and as such are listed in the directory of the Canadian Gold Mining Industry.

Radium (Pitchblende) Mining Industry (b)

(*) Canada Radium Mines, Ltd.	288 Bay St., Toronto, Ont.	Haliburton Co., Ont.
Product—Pitchblende.		
(*) Hottah Lake Gold & Radium Mines, Ltd.	1116 Federal Bldg., Toronto, Ont.	Northwest Territories.
Product—Pitchblende.		

(b) Also see under silver-lead-zinc mining industry.

(*) Active but not producing.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
------	---------------------	----------

Tellurium and Selenium (See copper refiners)

Titanium Ore Mining Companies

QUEBEC—		
Baie St. Paul Titanic Iron Ore Co.....	Baie St. Paul.....	St. Urbain.
Canadian Pyrites, Ltd.....	c/o E. L. du Pont de Nemours & Co., Wil- mington, Del., U.S.A.....	St. Urbain.

Tungsten Mining Industry

NOVA SCOTIA—		
(*)Indian Path Mines, Ltd.....	605 Dennis Bldg., Halifax, N.S.....	Lunenburg Co., N.S.
Product—Tungsten Ore.		
BRITISH COLUMBIA—		
Columbia Tungsten Co., Ltd.(*).	61 Broadway, New York, N.Y., U.S.A.....	Wells area—Dist. 2.

(*) Active but not producing.

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
Acadia Coal Co., Ltd.	Stellarton	<i>District</i>
Bras d'Or Coal Co., Ltd.	Little Bras d'Or Bridge	Pictou.
Cumberland Railway & Coal Co., Ltd.	Springhill	Cape Breton.
Dominion Coal Co., Ltd.	Sydney	Cumberland.
Greenwood Coal Co., Ltd.	New Glasgow	Cape Breton.
Indian Cove Coal Co., Ltd.	Sydney Mines	Pictou.
Intercolonial Coal Co., Ltd.	Westville	Cape Breton.
Inverness Coal Mine	Inverness	Pictou.
Maritime Coal, Railway & Power Co., Ltd.	Amherst	Inverness.
Nova Scotia Steel & Coal Co., Ltd.	Sydney	Cumberland.
Shore Coal Co., Ltd.	Amherst	Cape Breton.
Standard Coal Co., Ltd.	River Hébert	Cumberland.
Sydney Mines Coal Co., Ltd.	Sydney	Cape Breton.
Symons, J. F.	Port Hood	Inverness.
Victoria Coal Co., Ltd.	New Glasgow	Cumberland.
NEW BRUNSWICK—		
Avon Coal Co., Ltd.	Saint John	<i>County</i>
Evans, W. B.	Minto	Queens.
King, Gerald H.	Chipman	Queens.
Minto Coal Co., Ltd.	Minto	Queens.
Miramichi Lumber Co., Ltd.	Minto	Queens.
Newcastle Coal Co.	Minto	Queens.
Reade Construction Co., Ltd.	Chipman	Queens.
Welton, Harvey	Minto	Queens.
Welton & Henderson, Ltd.	Minto	Queens.
SASKATCHEWAN—		
Banks, H.	Taylorlton	<i>Municipality</i>
Baniulis Bros.	Roche Percée	Near Pinto.
Bienfait Mines, Ltd.	Bienfait	Roche Percée.
Blue Flame Coal Mines, Ltd.	Leakville	Near Bienfait.
Crescent Collieries, Ltd.	Bienfait	Near Leakville.
Eastern Collieries of Bienfait, Ltd.	Estevan	Near Bienfait.
Jenish Bros.	Estevan	Near Bienfait.
Lignite Coal Mines, Ltd.	Pinto	Near Estevan.
Manitoba and Saskatchewan Coal Co., Ltd.	303 Avenue Block, Winnipeg, Man.	Near Taylorlton.
Matheson and Urich.	Taylorlton	Near Bienfait (Taylorlton).
Poage, H. E.	Roche Percée	Taylorlton.
Shand Coal & Brick Co.	Shand	Roche Percée.
Sinclair Mine	Roche Percée	Shand.
Truax Traer Coal Co., Ltd.	Estevan	Roche Percée.
Western Dominion Collieries, Ltd.	Taylorlton	Near Estevan.
ALBERTA—		
Bituminous—		
Brazeau Collieries, Ltd.	Nordegg	<i>District</i>
Cadomin Coal Co., Ltd.	Cadomin (mine office) Edmonton (business office)	Nordegg.
Canmore Coal Co., Ltd.	Canmore	Mountain Park.
Hillcrest Collieries, Ltd.	Hillcrest	Cascade.
International Coal & Coke Co., Ltd.	Coleman	Crowsnest.
Luscar Collieries, Ltd.	Edmonton	Crowsnest.
McGillivray Creek Coal & Coke Co., Ltd.	Coleman	Mountain Park.
Mohawk Bituminous Mines, Ltd.	Bellevue	Crowsnest.
Mountain Park Collieries, Ltd.	410 Tegler Bldg., Edmonton	Crowsnest.
West Canadian Collieries, Ltd.	Blairmore	Mountain Park
Sub-bituminous—		
Alexo Coal Co., Ltd.	Alexo	Crowsnest.
Bighorn & Saunders Creek Collieries, Ltd.	Saunders	Saunders.
Bryan Coal Co., Ltd.	Edmonton	Saunders.
Coal Valley Mining Co., Ltd.	Coal Valley	Coalspur.
Foothills Collieries, Ltd.	Foothills	Coalspur.
Hinton Collieries, Ltd.	Hinton	Coalspur.
Jasper Coal Co., Ltd.	Edmonton	Prairie Creek.
Lakeside Coal, Ltd.	Edmonton	Prairie Creek.
McLeod River Hard Coal Co., Ltd.	Mercoal	Coalspur.
Sterling Collieries, Ltd.	Edmonton	Coalspur.
Lignite—		
Aetna Coal Co., Ltd.	East Coulee	Drumheller.
Alberta Block Coal Co., Ltd.	Drumheller	Drumheller.
Atlas Coal Co., Ltd.	East Coulee	Drumheller.
Balogh Coal Co., Ltd.	Carbon	Carbon.
Beverley Coal Co., Ltd.	Edmonton	Edmonton.
Brilliant Coal Co., Ltd.	Drumheller	Drumheller.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
Lignite—Concluded		<i>District</i>
Bush Mines, Ltd.	Edmonton.	Edmonton.
Cambrian Coal Co., Ltd.	Drumheller.	Drumheller.
Canadian Dinant Coal Co., Ltd.	Dinant.	Camrose & Carbon.
Canadian Pacific Railway Co.	Dept. of Natural Resources, Calgary.	Lethbridge.
Chinook Coal Co., Ltd.	Sheerness.	Sheerness.
City of Lethbridge Coal Mines.	Lethbridge.	Lethbridge.
Dawson Coal Co., Ltd.	Edmonton.	Edmonton.
Edina Coal Co., Ltd.	Edmonton.	Edmonton.
Elgin Coal Co., Ltd.	Drumheller.	Drumheller.
Ellerslie Colliery.	South Edmonton.	Edmonton.
Empire Collieries, Ltd.	East Coulee.	Drumheller.
Empire Collieries, Ltd.	Calgary.	Taber.
Fraser-Mackay Collieries, Ltd.	10055-101st St., Edmonton.	Edmonton.
Fridel Red Hot Coal Co.	Forest Heights.	Edmonton.
Gibb, W. E.	Edmonton.	Edmonton.
Gotheridge, W. T. & Sons.	Round Hill.	Camrose.
Great West Coal Co., Ltd.	Edmonton.	Edmonton.
Gunderson Brick & Coal Co., Ltd.	Redcliffe.	Redcliff.
Hamilton, J. J., Coal Co.	Lethbridge.	Lethbridge.
Hy-Grade Coal Co., Ltd.	Drumheller.	Drumheller.
Ideal Coal Co., Ltd.	Wayne.	Drumheller.
Jewel Collieries, Ltd.	Wayne.	Drumheller.
Keith & Fulton Coal Co.	Clover Bar.	Edmonton.
Kent Coal Co., Ltd.	Edmonton.	Edmonton.
Kleenbairn Collieries, Ltd.	Eyremore.	Brooks.
Lakeside Coals, Ltd.	Edmonton.	Pembina.
Leavell Coal Co., Ltd.	Sheerness.	Sheerness.
Lethbridge Collieries, Ltd.	Lethbridge.	Lethbridge.
Lund, Nelson, Hagblad & Degaust.	Lethbridge.	Lethbridge.
Maple Leaf Minerals, Ltd.	Drumheller.	Drumheller.
Marcus Coal Mines, Ltd.	Edmonton.	Edmonton.
McDonell Coal Co.	Namoo.	Edmonton.
Midland Coal Mining Co., Ltd.	Midlandvale.	Drumheller.
Murray Collieries, Ltd.	East Coulee.	Drumheller.
Mutual Supplies, Ltd.	Wayne.	Drumheller.
Newcastle Coal Co., Ltd.	Drumheller.	Drumheller.
Oliphant, John.	Medicine Hat.	Redcliff.
Oliphant, J. H.	Carbon.	Carbon.
Ottewell Coal Co.	Clover Bar.	Edmonton.
Parker, L.	Cardiff.	Edmonton.
Peerless Carbon Collieries.	Carbon.	Carbon.
Penn Coals, Ltd.	Edmonton.	Edmonton.
Poholka, S.	South Edmonton.	Edmonton.
Red Deer Valley Coal Co., Ltd.	Drumheller.	Drumheller.
Red Flame Coal Co.	Round Hill.	Camrose.
Rollingson, J.	Lethbridge.	Lethbridge.
Rosedale Collieries, Ltd.	Aerial.	Drumheller.
Rosedale Collieries, Ltd.	Rosedale.	Drumheller.
Royal Lethbridge Collieries.	Lethbridge.	Lethbridge.
Royalties Oil & Share Corp., Ltd.	Calgary.	Pembina.
Sinoski, M.	Strathcona.	Edmonton.
Stoney Creek Collieries, Ltd.	Camrose.	Camrose.
Super Heat Coal Co.	Ardley.	Ardley.
Superior Grade Coal Co., Ltd.	Wayne.	Drumheller.
Thomas Coal Mines, Ltd.	Drumheller.	Drumheller.
Tofield Coal Co., Ltd.	Tofield.	Tofield.
Tredway Bros.	Dodds.	Tofield.
Western Gem Coal Co., Ltd.	Drumheller.	Drumheller.
BRITISH COLUMBIA—		
Canadian Collieries, Ltd.	Nanaimo.	Island.
Coalmont Collieries, Ltd.	Coalmont.	Inland.
Corbin Collieries, Ltd.	Corbin.	Crow's Nest Pass.
Crow's Nest Pass Coal Co., Ltd.	Fernie.	Crow's Nest Pass.
Lantzville Collieries, Ltd.	Lantzville.	Island.
Middlesboro Collieries, Ltd.	Merritt.	Inland.
Pleasant Valley Mining Co., Ltd.	Princeton.	Inland.
Tulameen Coal Mines, Ltd.	Princeton.	Inland.
Western Fuel Corporation of Canada, Ltd.	Nanaimo.	Island.
Wilson Mining & Investment Co., Ltd.	Vancouver.	Inland.

Natural Gas Industry

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton.	<i>Field</i> Stoney Creek.
(b) Moncton Electricity & Gas Co., Ltd.	Moncton.	
ONTARIO—		
Acme Gas & Oil Co., Ltd.	Suite 705, 350 Bay St., Toronto.	<i>Township</i> Middleton.
(e) Ajax Oil & Gas Co., Ltd.	159 Bay St., Toronto.	Dover, Middleton and Tuscarora.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Continued		<i>Township</i>
(a) Allen, A. J.	Dunville.	
Aloka Oil Co., Ltd.	57 Queen St. W., Toronto.	Ancaster, Dereham, Onondaga and Woodhouse.
Amity Gas Co.	Lowbanks.	Moulton.
Aragain Gold & Natural Gas Syndicate	34 King St. E., Toronto.	Canboro.
Avery, Esmond & Associates.	5172 St. Jean Ave., Detroit, Mich., U.S.A.	Cayuga North.
Beacon Natural Gas Syndicate	189 King St. N., Waterloo.	Rainham and Walpole.
Beer, Geo.	Binbrook.	Binbrook.
(c) Ben Gas Company.	58 Courier Bldg., Buffalo, N.Y., U.S.A.	Canboro.
Benn, A. S.	Hagersville.	Walpole.
Bertie Gas Co.	Selkirk.	Bertie.
Binbrook Gas Co.	Binbrook.	Binbrook.
Blackheath Gas Co.	539 Penobscot Bldg., Detroit, Mich., U.S.A.	Seneca.
Border Cities Gas Co.	Hamilton.	Onondaga.
(b) Brantford Gas Co.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	
Broadway Gas Syndicate.	Jarvis.	Walpole.
Buck, C. S.	Port Bowan.	Walsingham South.
Burchell Natural Gas & Oil Syndicate.	1111 Canada Permanent Bldg., Toronto.	Canboro and Woodhouse.
Canada Cement Co., Ltd.	Port Colborne.	Wainfleet.
Canadian Natural Gas Syndicate	Simcoe.	Bayham and Moulton.
Canby, B. F.	Wainfleet.	Wainfleet.
(a) Canfield Gas Syndicate.	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga (North and South).
Canfield Natural Gas Co., Ltd.	Canfield.	Cayuga North.
(c) Central Pipe Line Co., Ltd.	Chatham.	Bayham, Houghton and Middleton.
Central Seneca Gas Syndicate.	Cayuga.	Seneca.
Coleman, J. A.	Wellandport.	Gainsboro and Wainfleet.
Colonial Natural Gas Co.	Stoney Creek.	Canboro and Moulton.
Columbia Natural Gas & Oil Co., Ltd.	515 Pigott Bldg., Hamilton.	Dunn.
Continental Gas.	33 Adelaide St. W., Toronto.	Binbrook and Walpole.
(e) Culver, W. H.	Dunville.	Oneida.
(c) Darroch & Young.	Onondaga.	Onondaga.
Dawson, Ralph.	Merlin.	Tilbury East.
Delhi Gas Syndicate.	Cayuga.	Walpole & Windham.
Domestic Gas Syndicate.	68 King St. E., Toronto.	Seneca.
Domestic Natural Gas Syndicate No. 2.	68 King St. E., Toronto.	(c) Seneca and (c) Walpole, (d) Cayuga North, Moulton, (e) Rainham.
Dominion Natural Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	Bayham, Binbrook, Caistor, Canboro, Cayuga, (North and South), Charlotteville, Dunn, Glanford, Houghton, Humberstone, Malahide, Middleton, Moulton, Oneida, Onondaga, Rainham, Seneca, Sherbrooke, Townsend, Wainfleet, Walpole, Walsingham, (North and South), Windham and Woodhouse.
(d) Dufferin Natural Gas Syndicate.	Shelburne.	Cayuga South.
(c) Dunnville Detroit Gas Syndicate.	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga North.
East Side Gas Co.	Lowbanks.	Sherbrooke.
Emerald Gas Syndicate.	288 Bay St., Toronto.	Moulton and Oneida.
(e) Emerson, H. L.	Dunville.	Canboro and Moulton.
Empire Natural Gas, Ltd.	34 King St. E., Toronto.	Walpole and Walsingham South.
Erie Gas, Limited.	9 Toronto St., Toronto.	Woodhouse.
Firelite Gas & Oil Co., Ltd.	288 Bay St., Toronto.	Oneida, Rainham, Walpole and Walsingham South.
Fisherville Gas Co.	Fisherville.	Rainham.
Gas Finders & Producers Syndicate.	Dunville.	Cayuga North, Oneida and Walpole.
Gas Producers Syndicate.	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Raleigh.
(d) Gaul, H. J.	Stratford.	Dorchester North.
Gifford, A., & Son.	Cayuga.	Cayuga South.
Glenny, D.	Dunville.	Canboro.
Grand River Gas & Oil Syndicate.	Canfield.	Cayuga North.
Grand River Gas Co.	Cayuga.	Moulton.
Grimshy Natural Gas Co., Ltd.	Grimsby.	Caistor and Gainsboro.
Haldimand Gas Syndicate.	Cayuga.	Rainham.
Haldimand Natural Gas Syndicate.	Stevensville.	Bertie.
Highbank Oil Limited.	215 King St. W., Chatham.	Raleigh.
Hill, A. W.	Coatsworth.	Tilbury East.
(a) Hoover, A. E.	Selkirk.	
Hope Gas Syndicate.	43 Ontario St., St. Catharines.	Moulton.
(a) House, Charles C.	Stevensville.	
House & Harris.	Stevensville.	Bertie.
(a) Hussey, W. J.	Petrolia.	
Ideal Gas Syndicate.	Fisherville.	Rainham.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Continued		<i>Township</i>
(a) Jackson, Percy L.	Dunnville.	
(e) Jaspersen, Bon.	Kingsville.	Gosfield South, Romney and Tilbury East.
Kelley Gas & Oil Syndicate.	357 Bay St., Toronto.	Rainham and Walpole.
Kindy, D., & Son.	Selkirk.	Rainham.
(a) Kiser Bros.	90 Park St., Chatham.	
Ladd & Kabana.	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Tilbury East.
(c) Ladd & Knight.	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Walpole and Rainham.
Ladd-Knight-Medina Natural Gas Company.	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Dover.
Ladd and Zeigen.	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Tilbury East.
(c) Lauer, D. G.	Tillsonburg.	
(b) Leamington, Town of.	Leamington.	
(a) Lewis, J. R.	Williamsville, New York, U.S.A.	
Lincoln Gas Co., Ltd.	10 Adelaide St. E., Toronto.	Caistor, Canboro, Gainsboro and Wainfleet.
Lindsay, William B., Estate of.	Canada Permanent Bldg., Edmonton, Alta.	Canboro, Rainham and Walpole.
(e) Lymburner Bros. & Webber.	Dunnville.	Moulton, Rainham and Walpole.
Lynn Valley Gas & Oil, Ltd.	112 Yonge St., Toronto.	Oneida.
(b) Manufacturers Natural Gas.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	
May-Gold and Natural Gas Syndicate.	511 National Bldg., Toronto.	Canboro.
(a) McCutcheon, Thos. J.	Dunnville.	
(a) McKechnie, S.	Dunnville.	
McKechnie & Hussey.	Dunnville.	Canboro.
(a) McKillop, Wm.	Hepworth.	
(a) McLister, J. J.	Dunnville.	
(a) McNinch, S. E.	Canboro.	
Melrose Oil & Gas Syndicate.	509 Kent Bldg., Toronto.	Oneida.
Middleton-Norfolk Gas Co.	Tillsonburg.	Middleton.
Midfield Consolidated Gas Co.	711 Federal Bldg., Toronto.	Cayuga North, Moulton and Oneida.
Midwal Oil & Gas Co., Ltd.	5 Elmer Ave., Toronto.	Dover, Middleton and Walingham North.
(c) Mining Claims, Limited.	Lowbanks.	Willoughby.
Minnicog Gas Company.	5172 St. Jean Ave., Detroit, Mich., U.S.A.	Cayuga North.
Mohawk Gas & Oil Syndicate, Ltd.	421 Main St. E., Hamilton.	Canboro, Oneida and Walpole.
Monarch Gas & Oil Syndicate.	Fisherville.	Walpole.
Mutual Natural Gas Syndicate.	36 King St. E., Toronto.	Rainham.
(c) Mytinger, L. P.	120 West St., Flint, Mich., U.S.A.	Rainham.
National Gas Syndicate.	Dunnville.	Seneca.
Nelles Corners Gas Co.	Nelles Corners.	Cayuga North and Rainham.
Niagara Natural Gas Co., Ltd.	401 Genesee Bldg., Buffalo, N.Y., U.S.A.	Moulton.
Niece, H., & Son.	Lowbanks.	Sherbrooke.
Norhal Gas and Oil, Ltd.	10 McNab St. S., Hamilton.	
North Cayuga Gas Syndicate.	1673 Beacon St., Brookline, Mass., U.S.A.	Cayuga North.
North Shore Gas Co.	Selkirk.	Rainham.
Northern Gas & Gasoline Co.	Hepworth.	Amabel.
(c) Nottawa Oil & Gas Co., Ltd.	17 Queen St. E., Toronto.	Amabel and Keppel.
(b) Oil Springs Oil & Gas Co., Ltd.	Oil Springs.	
Olga Gas, Limited.	73 Adelaide St. W., Toronto.	Raleigh.
(b) Ontario Salt Co. (J. R. Robert)	1428 Erie St. E., Windsor.	
Ottersville Natural Gas Syndicates No. 2 and No. 3.		
Patterson, W. C.	546 Confederation Life Bldg., Toronto.	Cayuga South and Walpole.
	Box 914, Jamestown, N.Y., U.S.A.	Bertie, Crowland, Dunn, Humberstone, Rainham, Walpole and Willoughby.
(a) Perkins, J. E.	Dunnville.	
Petrol Oil & Gas Co., Ltd.	73 Adelaide St. W., Toronto.	Dover, Oneida, Onondaga and Tuscarora.
(e) Port Colborne-Welland Natural Gas & Oil Co., Ltd.	Port Colborne.	Oneida, Onondaga, and Seneca.
Prairie Gas & Oil Co., Ltd.	350 Bay St., Toronto 2.	Dover.
Premier Oils, Limited.	539A St. Clair Ave. W., Toronto.	Onondaga.
Provincial Natural Gas & Fuel Co. of Ontario Limited.	Fort Erie North.	Bertie, Crowland, Humberstone and Willoughby.
Rainham Gas Syndicate.	Cayuga.	Rainham and Seneca.
Reicheld Gas Syndicate.	Jarvis.	Walpole.
Rich Natural Gas Syndicate.	18 Lola Rd., Toronto.	Moulton.
(e) Ricker, Arthur.	Canboro.	Canboro.
Riley, J. V.	Simcoe.	Moulton.
River Valley Natural Gas Syndicate.	112 Yonge St., Toronto.	Oneida.
(a) Rockton Oil & Gas Co., Ltd.	Dundas.	
Romney Gas & Oil Co.	306 Dundas St., London.	Romney & Tilbury East.
Rose Valley Natural Gas Syndicate.	67 Yonge St., Toronto.	Cayuga South.
Rowe, E. P.	350 Bay St., Toronto.	Bayham, Dover E., and Middleton.
Salina Gas Co., Ltd.	47 Sixth St., Chatham.	Tilbury East.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Concluded		<i>Township</i>
Sandusk Gas Syndicate.....	Fisherville.....	Walpole.
Sarnia Gas & Oil Co.....	110 Davis St., Sarnia.....	Enniskillen and Sarnia.
(d) Schwegler, F. A.....	Buffalo, N. Y., U.S.A.....	Willoughby.
(c) Security Oil & Gas Co., Ltd.....	Windsor.....	Binbrook, Glanford and Seneca.
Selected Natural Gas Syndicate.....	40 Garnock Ave., Toronto.....	Canboro, Moulton and Oneida.
(c) Seneca Drillers Syndicate.....	Dunnville.....	Canboro.
Shell, Charles H.....	704 Guaranty Trust Bldg., Windsor.....	Raleigh.
Shelton, S. F.....	York.....	Seneca.
Shepherd, E.....	Dunnville.....	Canboro.
Sherbrooke Gas Syndicate.....	Dunnville.....	Sherbrooke.
Sherk, John M.....	Stevensville.....	Bertie.
(e) Smith, R. H.....	Lowbanks.....	Moulton.
Southern Ontario Gas Co., Ltd.....	518 Jackson Bldg., Buffalo, N.Y., U.S.A.....	Mersea, Mosa, Raleigh, Romney and Tilbury East
Springvale Gas & Oil Co., Ltd.....	Hagersville.....	Walpole.
Standard Gas & Oil Syndicate.....	Fisherville.....	Rainham and Walpole.
Sterling Gas Co., Ltd.....	7 Quebec St. W., Guelph.....	Walpole.
Stevensville Natural Gas & Fuel Co.....	Stevensville.....	Bertie.
(e) Stewart Bros.....	Jarvis.....	Walpole.
(e) Stover & Rawlings.....	Chatham.....	Dover.
(a) Stubble, H. H.....	207 Patterson Ave., Chatham.....	
Stromwell Syndicate.....	Tillsonburg.....	Moulton.
(a) Sundry, B. K.....	Tillsonburg.....	
Superior Gas Syndicate.....	Fisherville.....	Rainham.
Sweets Corners Gas & Oil Syndicate.....	Fisherville.....	Rainham.
(c) Tanner, F. O.....	General Motors Bldg., Detroit, Mich, U.S.A.....	Cayuga North and Oneida.
Tillsonburg Oil & Gas Co., Ltd.....	9 Richmond St. E., Toronto.....	Middleton.
Union Gas Co. of Canada, Ltd.....	52 Fifth Ave., Chatham.....	Chatham, Dawn, Dover, Haldimand, Raleigh, Romney and Tilbury East.
Vacuum Gas & Oil Co., Ltd.....	350 Bay St., Toronto.....	Middleton.
Walpole Gas Syndicate.....	Cayuga.....	Walpole.
(e) Walter Gas Syndicate, Ltd.....	3020 Bailey Ave., Buffalo, N.Y., U.S.A.....	Canboro, Middleton, Townsend and Woodhouse.
(a) Wardell, J. L.....	Shelburne.....	
Welland County Gas Syndicate.....	Stevensville.....	Bertie.
Western Ontario Natural Gas Co., Ltd.....	Dunnville.....	Canboro, Cayuga North, Dunn, Sherbrooke and Wainfleet.
White Oil & Gas Co., Ltd.....	Victoria St., Sarnia.....	Walpole.
(a) Willits, Geo. & D. E.....	Bothwell.....	
(a) Wright, D., Estate of.....	Sarnia.....	
York Natural Gas Syndicate.....	34 King St. E., Toronto.....	Oneida and Seneca.
SASKATCHEWAN—		<i>Field</i>
Altoba Gas Exploration, Ltd.....	Box 28, Calgary.....	Manitou.
Colony Oil & Gas Co.....	Box 98, Lloydminster.....	Lloydminster.
Lloydminster Gas Co., Ltd.....	Lloydminster.....	Lloydminster.
ALBERTA—		
Alberta Clay Products Co.....	Medicine Hat.....	Medicine Hat.
Associated Oil & Gas Co., Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner Valley.
Baltac Oils, Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner Valley.
(b) Bow Island, Town of.....	Bow Island.....	
Calgary Power Co., Ltd.....	244 St. James St., Montreal, Que.....	Bassano.
Canadian Pacific Railway Co.....	Medicine Hat.....	Medicine Hat.
Canadian Western Natural Gas, Light, Heat & Power Co., Ltd.....	215-Sixth Ave. W., Calgary.....	Brooks and Foremost.
Canadian Western Power & Fuel Co., Ltd.....	Redcliff.....	Redcliff.
Carleton Royalties, Ltd.....	305 Foothills Bldg., Calgary.....	Turner Valley.
Century Royalties, Ltd.....	305 Foothills Bldg., Calgary.....	Turner Valley.
Dalhousie Oil Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Director Royalties, Ltd.....	415 Bank of Nova Scotia Bldg., Vancouver, B.C.....	Turner Valley.
Dominion Glass Co., Ltd.....	1111 Beaver Hall Hill, Montreal, Que.....	Redcliff.
East Crest Oil Co., Ltd.....	409 Maclean Block, Calgary.....	Turner Valley.
Foothills Oil & Gas Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Gold Standard Oils, Ltd.....	Wainwright.....	Wainwright.
Gundersen Brick & Coal Co., Ltd.....	Redcliff.....	Redcliff.
Highwood-Sarcee Oils, Ltd.....	65 Canada Life Bldg., Calgary.....	Turner Valley.
Hudson's Bay Oil & Gas Co., Ltd.....	Box 120, Wellington, Colorado, U.S.A.....	Viking.
Hyo Oils, Ltd.....	118 Renfrew Bldg., Calgary.....	Turner Valley.
Lowery Petroleum, Ltd.....	44 Victoria St., Toronto, Ont.....	Turner Valley.
Maple Leaf Milling Co., Ltd.....	Medicine Hat.....	Medicine Hat.
Maple Leaf Oil Co., Ltd.....	1007 Stock Exchange Bldg., Vancouver, B.C.....	Fabyan.
Mar-Jon Oil Co., Ltd.....	828 Rogers Bldg., Vancouver, B.C.....	Turner Valley.
McDougall-Segur Exploration Co. of Canada, Ltd.....	70 Union Bldg., Calgary.....	Turner Valley.
McLeod Oil Co., Ltd.....	203 Grain Exchange Bldg., Calgary.....	Turner Valley.
Medicine Hat Brick & Tile Co., Limited.....	Medicine Hat.....	Medicine Hat.
Medicine Hat, City of.....	Medicine Hat.....	Medicine Hat.
Mercury Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
Merland Oil Co. of Canada, Ltd.	10 Clarence Block, Calgary	<i>Field</i> Turner Valley.
Miracle Oils, Ltd.	300 Lancaster Bldg., Calgary	Turner Valley.
Moose Oils, Ltd.	714 Lancaster Bldg., Calgary	Moose Dome.
Northwest Royalties, Ltd.	212 Grain Exchange Bldg., Calgary	Turner Valley.
Northwestern Utilities, Ltd.	10124-104th St., Edmonton.	Viking.
Ogilvie Flour Mills Co., Ltd.	Medicine Hat.	Medicine Hat.
Oil Investors, Ltd.	1005-Ninth Ave. E., Calgary	Turner Valley.
Pekisko Hills Co., Ltd.	4 Central Bldg., Calgary	Pekisko.
Range Oil & Gas Co., Ltd.	101 Canadian Bank of Commerce Bldg., Calgary	Borden. Redcliff. Redcliff.
Redcliff Premier Brick Co., Ltd.	Redcliff.	Redcliff.
Redcliff Pressed Brick Co.	Redcliff.	Redcliff.
Richfield Petroleum, Ltd.	225A Eighth Ave. W., Calgary	Turner Valley.
Royalite Oil Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Southwest Petroleum Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Spooner Oils, Ltd.	717-718 Lancaster Bldg., Calgary	Turner Valley.
Sterling Royalties, Ltd.	305 Foothills Bldg., Calgary	Turner Valley.
Suffield, Village of.	Suffield.	Suffield.
United Natural Gas Development Co.	200-203 Leeson-Lineham Block, Calgary	Foremost.
Vanalta, Limited.	Granville Island, Vancouver, B.C.	Red Coulee.
(b) Wainwright Gas Co., Ltd.	36 Dominion Bank Bldg., Edmonton.	Wetaskiwin.
Wetaskiwin, City of.	Wetaskiwin.	Wetaskiwin.

- (a) Drilling only.
 (b) Distributing only.
 (c) Producing wells drilled in 1935—no output reported.
 (d) Dry well drilled in 1935.
 (e) Drilling and producing.

Peat Industry

Countryman, G.	Chesterville.	Winchester Tp.
Fleming, John.	Morewood.	Winchester Tp.
Leasa, Wm.	Milverton.	Ellice Tp.
Runke, George and Sons.	Kitchener.	
Stewart Bros.	Chesterville.	Winchester Tp.

Crude Petroleum Industry

NEW BRUNSWICK—		<i>Field</i>
New Brunswick Gas & Oil Fields, Ltd.	Moncton.	Stoney Creek.
ONTARIO (a)—		
Armstrong, J. E., Estate of.	Petrolia.	Petrolia and Enniskillen.
Barnes, Henry.	Oil Springs.	Oil Springs.
Beattie, John.	Glencoe.	Mosa.
Brock, Thos.	Petrolia.	Petrolia and Enniskillen.
Brown, J.	Corunna.	Moore.
Bryson, G. C.	Petrolia.	Petrolia and Enniskillen.
Byers Bros.	Oil Springs.	Oil Springs.
Byers, Mrs. Lydia.	Oil Springs.	Oil Springs.
Canadian Oil Refineries, Ltd.	12 Strachan Ave., Toronto.	Petrolia and Enniskillen.
Carlton, W. G.	Petrolia.	Petrolia and Enniskillen.
Colchester Oil and Gas Co.	Toronto.	Thamesville.
Cole, W. J.	Petrolia.	Petrolia and Enniskillen.
Collins, Matthew.	Petrolia.	Petrolia and Enniskillen.
Crocker-Parks Oil Co., Ltd., The.	Oil Springs.	Oil Springs.
(b) Demary, C.	Kerwood.	—
Dennis, Charles.	Oil Springs.	Oil Springs.
Dennis, Welcome.	Oil Springs.	Oil Springs.
Dewhurst, Murray.	Petrolia.	Petrolia and Enniskillen.
Dominion Petroleum Co., Ltd., The.	Bank of Montreal Chambers, London.	Mosa.
Donald, George.	Oil Springs.	Oil Springs.
Edward, F. H.	Petrolia.	Petrolia and Enniskillen.
Fairbank, J. H., Estate of.	Petrolia.	Oil Springs.
Flett & McCort.	Petrolia.	Petrolia and Enniskillen.
Forsythe, A.	Copleston.	Petrolia and Enniskillen.
Gillespie, Wm. O.	Petrolia.	Petrolia and Enniskillen.
Goudie, Elroy.	Petrolia.	Petrolia and Enniskillen.
(b) Gregory, G. F.	Petrolia.	Petrolia and Enniskillen.
Hamlin, F. G.	Petrolia.	Petrolia and Enniskillen.
(b) Heal, A. A.	Petrolia.	Petrolia and Enniskillen.
Hillis Bros.	Oil Springs.	Oil Springs.
(b) Hockley Valley Oil Co., Ltd.	804 Star Bldg., Toronto.	—
Holmes, E. B.	Bothwell.	Bothwell.
Houston, Mrs. Annie.	Petrolia.	Petrolia and Enniskillen.
(c) Howlett, Fred W., & Sons, Ltd.	Petrolia.	Petrolia and Enniskillen.
(b) Hussey, W. J.	Petrolia.	—
(c) Kells, E. E.	Petrolia.	Petrolia and Enniskillen.

DIRECTORY OF FIRMS—Continued

Crude Petroleum Industry—Continued

Name	Head office address	Location
ONTARIO (a)—Concluded		
Kelly, J. E.	Petrolia.	<i>Field</i> Petrolia and Enniskillen.
Kerr, John, Estate of.	Petrolia.	Petrolia and Enniskillen.
Kettle, Robt.	Petrolia.	Petrolia and Enniskillen.
Lather, Arthur.	Bothwell.	Petrolia and Enniskillen.
(b) Lauer, D. G.	Tillsonburg.	Bothwell.
Levine, Harry.	Petrolia.	Petrolia and Enniskillen.
Lewis Bros.	Oil Springs.	Oil Springs.
(b) Lewis, J. R.	Williamsville, N. Y., U.S.A.	—
Loton, Percy.	Bothwell.	Bothwell.
(b) Marchant, F. J.	Petrolia.	—
McCrie, R. D.	Bothwell.	Bothwell.
(b) McGaffey, R.	Bothwell.	—
McGill, J.	Bothwell.	Bothwell.
McGillivray, G. A.	201 Mount Pleasant Ave., London.	Oil Springs.
(b) McMaster, W. R.	Flesherton.	—
McMillan, D. C. & Warwick, J.	Bothwell.	Bothwell.
Miller, Agnes E.	Petrolia.	Petrolia and Enniskillen.
Mitchell, Chas.	Oil Springs.	Oil Springs.
Mitchell, D. J.	Glencoe.	Mosa.
Mitchell, Robert.	Oil Springs.	Oil Springs.
Morningstar, H. M.	Oil Springs.	Oil Springs.
Morningstar, L. H.	Oil Springs.	Oil Springs.
Morris, George.	Petrolia.	Petrolia and Enniskillen.
Ontario Lands & Oil Co., Ltd., The.	Petrolia.	Petrolia and Enniskillen.
Parks, Blake.	Petrolia.	Petrolia and Enniskillen.
Petrol Oil and Gas Co., The.	73 Adelaide St. W., Toronto.	Dover.
Prairie Oil and Gas Co.	350 Bay St., Toronto.	Dover.
Premier Oils, Limited.	539A St. Clair Ave. W., Toronto.	Onondaga.
Randle, Herbert.	Bothwell.	Bothwell.
(b) Rawson, W.	Petrolia.	—
Rawson, W. J.	Petrolia.	Petrolia and Enniskillen.
(b) Seynuck Valley Oil Co., Ltd.	Acton.	—
Slack, Chas. M.	Petrolia.	Petrolia and Enniskillen.
Sproule Bros.	Oil Springs.	Oil Springs.
Sutherland, B. M.	Petrolia.	Oil Springs.
Telsey Syndicate.	Petrolia.	Petrolia and Enniskillen.
Union Gas Co. of Canada, Ltd.	Gas Bldg., Fifth St., Chatham.	Dawn.
Wallen & Wallen, Estate of.	Oil Springs.	Oil Springs.
Warwick, J.	Oil Springs.	Oil Springs.
(b) Weeks, F.	Sarnia.	—
(b) Willits, D. E.	Bothwell.	—
Winnett, J. W. G.	418½ Talbot St., London.	Bothwell.
Woodward, Wm.	Oil Springs.	Oil Springs.
Yerks, Carlton S.	Petrolia.	Petrolia and Enniskillen.
Yerks, Frank.	Petrolia.	Petrolia and Enniskillen.
(a) Producers of 300 barrels or more during the year.		
(b) Drillers only.		
(c) Producers and drillers.		
ALBERTA—		
Associated Oil & Gas Co., Ltd.	200 Leeson-Lineham Block, Calgary.	Turner Valley.
Baltac Oils, Ltd.	200 Leeson-Lineham Block, Calgary.	Turner Valley.
British Dominion Oil & Development Corp., Ltd.	208 Dominion Bank Bldg., Calgary.	Turner Valley.
British Wainwright Oil & Development Co., Ltd.	703 Paris Bldg., Winnipeg, Man.	Wainwright.
Carleton Royalties, Ltd.	305 Foothills Bldg., Calgary.	Turner Valley.
Century Royalties, Ltd.	305 Foothills Bldg., Calgary.	Turner Valley.
Dalhousie Oil Co., Ltd.	606-Second St. W., Calgary.	Turner Valley.
Devenish Petroleum, Ltd.	300 Leeson-Lineham Block, Calgary.	Skiff.
Director Royalties, Ltd.	415 Bank of Nova Scotia Bldg., Vancouver, B.C.	Turner Valley.
East Crest Oil Co., Ltd.	409 Maclean Block, Calgary.	Turner Valley.
Edalta Oils, Limited.	9562 Grierson Ave., Edmonton.	Wainwright.
Edmonton Wainwright Oils, Ltd.	Wainwright.	Wainwright.
Foothills Oil & Gas Co., Ltd.	606-Second St. W., Calgary.	Turner Valley.
(c) Franco Oils Co.	Cardston.	Cardston.
Freehold Oil Corp., Ltd.	803 Lancaster Bldg., Calgary.	Turner Valley.
(d) Gas and Oil Products, Ltd.	300 Lancaster Bldg., Calgary.	Turner Valley.
Gold Standard Oils, Ltd.	Wainwright.	Wainwright.
Hargal Oils, Limited.	1007 Stock Exchange Bldg., Vancouver, B.C.	Turner Valley and Wainwright.
Highwood Sarcee Oils, Ltd.	65 Canada Life Bldg., Calgary.	Turney Valley.
Homestead Oils, Ltd.	303 Beveridge Bldg., Calgary.	Turner Valley.
(c) Hunter Valley Oil Co., Ltd.	508 Lougheed Bldg., Calgary.	Hunter Valley.
Hyla Oils, Limited.	Renfrew Bldg., Calgary.	Turner Valley.
Lowery Petroleum, Ltd.	Room 1309, 44 Victoria St., Toronto, Ont.	Turner Valley.
Mar-Jon Oil Co., Ltd.	827 Rogers Bldg., Vancouver, B.C.	Turner Valley.
(c) McDougall-McLeod Co., Ltd.	229-Eighth Ave. W., Calgary.	Comrey.
McDougall-Segur Exploration Co., of Canada, Limited.	70 Union Bldg., Calgary.	Turner Valley.
McLeod Oil Co., Ltd.	203 Grain Exchange Bldg., Calgary.	Turner Valley.
Mercury Oils, Limited.	300 Lancaster Bldg., Calgary.	Turner Valley.

DIRECTORY OF FIRMS—Continued

Crude Petroleum Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		<i>Field</i>
Merland Oil Co. of Canada, Ltd.....	10 Clarence Block, Calgary.....	Turner Valley.
Mill City Petroleums, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Miracle Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Model Oils, Ltd.....	7 Cameron Block, Calgary.....	Turner Valley.
Moose Oils, Ltd.....	714 Lancaster Bldg., Calgary.....	Moose Dome.
Northwest Co., Limited.....	606 Second St. W., Calgary.....	Turner Valley.
(c) Northwest Royalties, Ltd.....	212 Grain Exchange Bldg., Calgary.....	Turner Valley.
Oil Investors, Ltd.....	1005-Ninth Ave. E., Calgary.....	Turner Valley.
Onalta Oil Co. (well).....	Wainwright.....	Wainwright.
Pacalta Operating Royalty Holders Committee.....	317 Alberta Corner, Calgary.....	Turner Valley.
Paramount Oils, Ltd.....	Grain Exchange Bldg., Calgary.....	Turner Valley.
(c) Pekisko Hills Co., Ltd.....	4 Central Bldg., Calgary.....	Pekisko.
(c) Phillips Royalties, Ltd.....	55 Canada Life Bldg., Calgary.....	Turner Valley.
Publix Oil & Gas, Ltd.....	226 Examiner Bldg., Calgary.....	Turner Valley.
(c) Renfrew Royalty Co., Ltd.....	225A Eighth Ave. W., Calgary.....	Turner Valley.
Richfield Petroleum, Ltd.....	225A Eighth Ave. W., Calgary.....	Turner Valley.
(e) Royalite Oil Co., Ltd.....	606 Second St., W., Calgary.....	Turner Valley.
Sasko-Wainwright Oil & Gas, Ltd.....	108 Bowerman Bldg., Saskatoon, Sask.....	Wainwright.
Southwest Petroleum Co., Ltd.....	606 Second St., W., Calgary.....	Turner Valley.
Spooner Oils, Limited.....	717-8 Lancaster Bldg., Calgary.....	Turner Valley.
Sterling Royalties, Ltd.....	305 Foothills Bldg., Calgary.....	Turner Valley.
Structure Oil & Gas Co., Ltd.....	Calgary.....	Turner Valley.
(c) Turner Valley Royalties, Ltd.....	14 Union Bk. Bldg., Calgary.....	Turner Valley.
Vanalta, Limited.....	Granville Island, Vancouver, B.C.....	Red Coulee.
Wainwright Petroleums, Ltd.....	10625-99th Ave., Edmonton.....	Wainwright.
Western Consolidated Oils, Ltd.....	Wainwright.....	Wainwright.
Widney Oils, Limited.....	229 Eighth Ave. W., Calgary.....	Turner Valley.
NORTHWEST TERRITORIES—		
Northwest Co., Ltd.....	606 Second St. W., Calgary.....	Fort Norman.

(c) Drilling only.

(d) Operates an absorption plant.

(e) In addition to operating wells in the Turner Valley field this company operates two absorption plants.

OTHER NON-METAL MINING INDUSTRIES

Actinolite Mining Industry

Name	Head office address	Location
ONTARIO—		
*The Actinolite Mining Co.....	1529 Macgregor St., Montreal, Que.....	Kaladar, Ont.
* Not producing.		

Asbestos Mining Industry

QUEBEC—		
Asbestos Corporation, Ltd.....	Canada Cement Bldg., Montreal.....	Thetford Mines, East Broughton, Black Lake and Coleraine.
Canadian Johns-Manville Co., Ltd.....	Montreal.....	Asbestos.
Johnson's Co.....	Thetford Mines West.....	Thetford Mines and Coleraine.
(a) Keasbey & Mattison Co.....	Ambler, Pa., U.S.A.....	Thetford Mines.
Nicolet Asbestos Mines, Ltd.....	c/o Greenshields & Greenshields, Transpor- tation Bldg., Montreal.....	Wotton Tp. and Tingwick Tp.
Northern Asbestos Co., Ltd.....	Black Lake.....	Thetford Mines.
Quebec Asbestos Corp., Ltd.....	East Broughton.....	East Broughton.
Bell Asbestos Mines, Ltd.....	Thetford Mines.....	Thetford Mines.
ONTARIO—		
*Rahn Lake Mines, Ltd.....	Box 422 North Bay.....	Matachewan.
* Active but not producing. (a) Sold business to Bell Asbestos Mines, Ltd.		

Bituminous Sands

ALBERTA—		
*Absand Oils, Ltd.....	3703 Northern Ontario Bldg., Toronto, Ont..	Northern Alberta.
*Bituminous Sand Extraction Co., Ltd.....	507 MacLean Block, Calgary.....	Northern Alberta.
McMurray Asphaltum & Oil, Ltd.....	Petrolia, Ont.....	Northern Alberta.
* Active but not producing.		

Diatomite

NOVA SCOTIA—		
International Diatomite Industries, Ltd.....	206 Patriot Bldg., Concord, New Hamp- shire, U.S.A.....	Little River, East New Annan.
ONTARIO—		
Muskoka Diatomite, Ltd.....	701 Central Bldg., Toronto.....	Gravenhurst.
Diatomite Refiners Co.....	45 Richmond St. W., Toronto.....	Novar, Muskoka.
Canadian Multi-Cell, Ltd.....	507 Harbour Commission Bldg., Toronto...	Martin's Siding.
BRITISH COLUMBIA—		
(a) B.C. Refractories, Ltd.....	660 Taylor St., Vancouver.....	Quesnel.
March, R. L.....	Quesnel.....	Quesnel.
(a) Now operated under the name "Fairey and Cuncliffe".		

Feldspar and Quartz Mining Industry

NOVA SCOTIA—		
(a) Dominion Steel & Coal Corp., Ltd.....	Sydney.....	Leitches Creek.
QUEBEC—		
(a) Bigelow, Robert.....	Buckingham.....	Buckingham Dist.
Cameron, J. J.....	Buckingham.....	Buckingham Dist.
(a) Canadian Carborundum Co., Ltd.....	Box 65, Niagara Falls, Ont.....	St. Canut.
(*) Canadian Flint & Spar Co., Ltd.....	Box 340, Buckingham.....	Buckingham.
(*) (a) Canadian Kaolin Silica Products, Ltd.	660 St. Catherine St. W., Montreal.....	St. Remi d'Amherst.
Clement, D.....	Buckingham.....	Buckingham Dist.
Côté, Madame, P. M.....	140 Wellington St., Ottawa, Ontario.....	Hull Dist.
Derry Mining Co.....	Box 202, Buckingham.....	Papineau Co.
(a) Donaldson, R. J.....	Glen Almond.....	Buckingham Tp.
Evans, W. H.....	Box 386, Buckingham.....	Portland Tp.
(a) Hill, Nelson.....	Glen Almond.....	Buckingham Tp.
Lauzon, John.....	Buckingham.....	Buckingham Dist.

DIRECTORY OF FIRMS—Continued

Feldspar and Quartz Mining Industry—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
(a) Les Produits Silica Canadiens, Ltée.....	4074 Marlowe Ave., Montreal.....	Roberval Co.
(a) McClement, Albert.....	Buckingham.....	Derry Tp.
McDonnell, B. A.....	Glen Almond.....	Joly Co.
(a) McLean-McNicol, Ltd.....	607 Confederation Bldg., Montreal.....	East Templeton.
(*) (a) Ottawa Silica and Sandstone, Ltd.....	East Templeton.....	Derry Tp.
Parcher, Alfred.....	Glen Almond.....	Buckingham Dist.
Parcher, Alton.....	Buckingham.....	Buckingham Dist.
(a) Parcher, Wilson.....	Buckingham.....	Buckingham Dist.
Pedneaud, G.....	Glen Almond.....	Derry Tp.
Perkins Mining Co.....	Gatineau Point.....	Derry Tp.
Sellers, W.....	Glen Almond.....	Derry Tp.
Wallingford, A.....	Gatineau Point.....	Buckingham Dist.
Wallingford & Cornu.....	Buckingham.....	Buckingham Dist.
(a) Wallingford, J.....	Perkins.....	Perkins.
(a) Warwick, Wm.....	Buckingham.....	Buckingham Dist.
Whitfield, T.....	Buckingham.....	Buckingham Dist.
Winning, Bush.....	Notre Dame de la Salette.....	Portland Tp. W.
ONTARIO—		
Barr, W. J.....	Westmeath.....	Renfrew Co.
Bathurst Feldspar Mines.....	230 King St. E., Toronto.....	Lanark Co.
(c) Canadian Nepheline, Ltd.....	320 Bay St., Toronto.....	Peterborough Co.
Charette, S. & Sons.....	Estaire.....	Burwash Tp.
Craig, T. H.....	Perth.....	Lanark Co.
(a) Dominion Mines & Quarries, Ltd.....	340 University Ave., Toronto.....	Killarney.
(b) Feldspar Quarries, Ltd.....	1403 Trenton Trust Bldg., Trenton, N.J., U.S.A.....	Frontenac Co.
(*) Frontenac Floor & Wall Tile Co.....	Kingston.....	Kingston.
Gunter, J. A.....	Princess Lake.....	Sabine Tp.
MacDonald, P.....	Hybla.....	Hybla.
Renfrew Minerals, Ltd.....	901 Royal Bank Bldg., Toronto.....	Quadville.
(b) Western Silica, Ltd.....	306 Great West Permanent Bldg., Winnipeg, Manitoba.....	Minaki.
(a) Wright & Co.....	960 Queen St., Sault Ste-Marie.....	Deroche Tp.
MANITOBA—		
Feldspar Products Co.....	Warrood, Minn., U.S.A.....	Pointe Du Bois.
(a) Reported production of silica only.		
(*) Operated dressing plants.		
(b) Inactive.		
(c) Produced nepheline syenite.		
NOTE.—In addition to these operators, metallurgical plants in Ontario, Manitoba, Saskatchewan and British Columbia produced silica flux for their own use.		

Fluorspar

ONTARIO—		
Stocklosar, Chas. A.....	Box 198, Madoc.....	Hastings Co.

Garnets

QUEBEC—		
(*) McLean-McNicol, Ltd.....	607 Confederation Life Bldg., Montreal.....	Joly Tp. and Labelle Co.

(*) Produces "garno-grit".

Graphite

QUEBEC—		
*Canadian Graphite Corporation.....	1193 Phillips' Place, Montreal.....	Boyer Tp.
ONTARIO—		
Black Donald Graphite Co., Ltd.....	Calabogie.....	Brougham Tp.

* Company now inactive.

Grindstones, Pulpstones and Sharpening Stones

NOVA SCOTIA—		
The Read Stone Co., Ltd.....	Box 549, Sackville, N.B.....	Quarry Island.
NEW BRUNSWICK—		
Boyle Robin (Miramichi Quarry Co., Ltd.)..	54 Atlas Ave., Toronto, Ontario.....	Quarryville.
The Read Stone Co., Ltd.....	Box 549, Sackville.....	Stonehaven.
Smith, E. A.....	Box 79, Shediac.....	Shediac.
BRITISH COLUMBIA—		
J. A. and C. H. McDonald, Ltd.....	1571 Main St., Vancouver.....	Gabriola Island and Vancouver.

DIRECTORY OF FIRMS—Continued

Gypsum Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
(a) Atlantic Gypsum Products Co.....	40 Central St., Boston, Mass., U.S.A.....	Aspy Bay Chéticamp and Walton.
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Wentworth.
The Connecticut Adamant Plaster Co.....	10 River St., New Haven, Conn., U.S.A.....	Chêverie.
The Nova Scotia Coal & Gypsum Co., Ltd.....	Box 13, Mabou.....	Mabou Harbour.
North American Gypsum Co.....	96 Curtis Ave., Rutland, Vt., U.S.A.....	Baddeck Bay.
(*) Windsor Gypsum Co.....	Box 727, Newburgh, N.Y., U.S.A.....	Newport Station.
Windsor Plaster Co., Ltd.....	Windsor.....	Brooklyn, Hants Co.
(*) Victoria Gypsum Co., Ltd.....	Little Narrows.....	Cape Breton.
NEW BRUNSWICK—		
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Hillsborough.
(*) Thompson, F. M.....	Hillsborough.....	Petitcodiac Co.
ONTARIO—		
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto.....	Hagersville.
Gypsum, Lime and Alabastine, Canada, Ltd.....	Paris.....	Caledonia.
MANITOBA—		
Gypsum, Lime and Alabastine, Canada, Ltd.....	Paris, Ont.....	Gypsumville.
Western Gypsum Products, Ltd.....	503 McArthur Bldg., Winnipeg.....	Amaranth.
BRITISH COLUMBIA—		
Gypsum, Lime and Alabastine, Canada, Ltd.....	Paris, Ont.....	Falkland.

(*) Active but not producing.

(a) Taken over in 1936 by the National Gypsum Co., 188 Delaware Ave., Buffalo, N.Y.

Iron Oxides Mining Industry

QUEBEC—		
Argall, Thos. H.....	639 St. Angel St., Three Rivers.....	La Pointe du Lac.
Girardin, Chas. D.....	Box 104, Yamachiche.....	Almaville.
Sherwin-Williams Co., Ltd.....	2875 Centre St., Montreal.....	Red Mill.
BRITISH COLUMBIA—		
Davidson, J. G. & Thompson, J. H.....	3498 Marine Drive, Vancouver.....	Mons.
McDonald, R.....	128 Grizzly St., Banff, Alta.....	Windermere Dist.

Magnesitic Dolomite

QUEBEC—		
Canadian Refractories, Ltd.....	1050 Canada Cement Bldg., Montreal.....	Grenville Tp.
International Magnesite Co., Ltd.....	Calumet.....	Harrington Tp.
BRITISH COLUMBIA—		
*Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Marysville.

* No production reported in 1935.

Magnesium Sulphate

BRITISH COLUMBIA—		
Epsom Refineries, Ltd.....	395 Main St., Winnipeg, Man.....	Kamloops, Dist.

Mica Mining Industry

QUEBEC—		
(*) Ahearn, W.....	538 MacLaren St., Ottawa, Ont.....	Hull Tp.
Bazin, Francis.....	5778 Cartier St., Montreal.....	Joliette Tp.
(a) Blackburn Brothers, Ltd.....	Blackburn Bldg., Ottawa, Ont.....	Templeton Tp.
(*) Bonhomme, T.....	Papineauville.....	Perkins.
Charlevoix Radium Exp. Co., Ltd.....	259 St. Jean St., Quebec.....	(East) Wakefield Tp.
Cleary, G.....	Wilson's Corners.....	Hull Tp.
Cross, W. C.....	209 Bridge St., Hull.....	Hull Dist.
Flynn, H. T., Estate of.....	33 Montcalm St., Hull.....	Buckingham Dist.
Gauthier, J. B.....	Buckingham.....	Argenteuil Co.
Goudreau, J.....	61 rue d'Auteuil, Quebec.....	East Templeton.
Laurin, Alfred.....	R.R. 1, Ste. Rose de Lima.....	Hull and Wakefield Tps.
Martin, A. G.....	236 Besserer St., Ottawa, Ontario.....	

DIRECTORY OF FIRMS—Continued

Mica Mining Industry—Concluded

Name	Head office address	Location
QUEBEC—Concluded.		
McGlashan, R. J.	190 Montcalm St., Hull.	Hull Dist.
McGlashan, Wm.	R. R. I., Wilson's Corners.	Wakefield (East Tp.)
Morlot, Chas.	Low.	Low Tp.
Tremblay, André.	St. Pierre de Wakefield.	Wright Co.
Trudeau, Wm.	Old Chelsea.	Hull (East) Tp.
(*) Toutloff, Frank.	Gatineau Point.	Templeton.
Wilson, S., Estate of.	Cascades.	Ladysmith.
ONTARIO—		
Bennett, H. V.	Perth.	Perth Dist.
30 Island Lake Mica Co.	Verona.	Frontenac and Lanark Co's.
Kent Brothers.	114 Gore St., Kingston.	Frontenac Co.
Lee, W. W.	Bedford Mills.	Buck Lake.
Loughborough Mining Co., Ltd.	Sydenham.	Sydenham.
Martin, A. G.	236 Besserer St., Ottawa.	Ottawa.
BRITISH COLUMBIA—		
(*) Ray, Philip M.	Prince Rupert.	Baker Inlet.

(*) Active, but not producing. (a) Operates grinding plant.

Mineral Waters (Natural)

QUEBEC—		
Abenakis Springs Co.	Blondin.	
Bellemarre, Josephat.	St. Barnabé Nord.	
Eau Minérale Etoile.	Ste. Geneviève de Batiscan.	
Gurd, Chas., & Co., Ltd.	1016 Bleury St., Montreal (*).	
La Certe Adélaïde.	St. Sévère.	
La Cie Embouteillage Idéal.	3 St. Germain St., St. Hyacinthe.	
La Cie d'Embouteillage St. Laurent.	64 St. Pierre St., St. Hyacinthe.	
La Cie d'Eau Minérale.	148 Concorde St., St. Hyacinthe.	
L'Eau Naturelle Purgative de Chamford.	Desbiens.	
Maski Bottling Works.	Maskinongé.	
Pellerin, Albert and Sons.	St. Barnabé Nord.	
Radnor Mineral Water Springs.	St. Maurice.	
Richard, Girard.	St. Grégoire.	
Source, Coulombia.	L'Epiphanie.	
ONTARIO—		
Boyd, T. R.	Carlsbad Springs.	
Deneault, F.	Bourget.	
Gurd, Chas., & Co., Ltd.	1016 Bleury St., Montreal, Que. (*).	

(*) Head office address.

Phosphate

QUEBEC—		
Bigelow, Venard.	Glen Almond.	
Cameron, Wm.	Buckingham.	
Cross, W. C.	Hull.	
ONTARIO—		
Loughborough Mining Co., Ltd., The.	Sydenham.	

Pyrites (Sulphur)

Name	Head office address	Location
QUEBEC—		
(*) Aldermac Mines, Ltd.	941 Dominion Square Bldg., Montreal.	Boischâtel Tp.
(*) Consolidated Copper & Sulphur Co., Ltd.	Eustis.	Ascot Tp.
ONTARIO—		
(a) International Nickel Co. of Canada, Ltd.	Copper Cliff.	Copper Cliff.
BRITISH COLUMBIA—		
(a) Consolidated Mining & Smelting Company of Canada, Ltd.	Trail.	Trail.
(*) Britannia Mining & Smelting Co., Ltd.	Britannia Beach.	Britannia Beach.

concentrated from copper ore. (a) Salvaged smelter gas.

DIRECTORY OF FIRMS—Continued

Salt Industry

Name	Head office address	Location
NOVA SCOTIA— Malagash Salt Co., Ltd.....	204 Provost St., New Glasgow.....	Malagash.
ONTARIO— Brunner, Mond Canada, Ltd..... Canadian Industries, Limited..... The Dominion Salt Co., Ltd..... Goderich Salt Co., Ltd..... The Walker Salt Corp., Ltd..... Warwick Pure Salt Co., Ltd..... Western Canada Flour Mills, Co., Ltd.....	Canadian Bank of Commerce Bldg., Toronto. P.O. Box 1260, Montreal, Que..... Sarnia..... Goderich..... Port Franks..... R.R. 5, Watford..... 287 MacPherson Ave., Toronto.....	Amherstburg. Sandwich. Sarnia. Goderich. Port Franks. Lambton County. Goderich.
MANITOBA— Neepawa Salt, Ltd.....	Box 99, Neepawa.....	Neepawa.
SASKATCHEWAN— Simpson Oil Co., Ltd.....	Simpson.....	Simpson.

Silica Brick

NOVA SCOTIA— Dominion Steel & Coal Corp., Ltd.....	Sydney.....	Sydney.
ONTARIO— Algoma Steel Corp., Ltd.....	Sault Ste-Marie.....	Sault Ste-Marie.

Sodium Carbonate

BRITISH COLUMBIA— B.C. Sodium Syndicate.....	Kamloops.....	Cherry Creek.
---	---------------	---------------

Sodium Sulphate

SASKATCHEWAN— Alexander, W. R..... Dominion Sodium Refineries, Ltd..... Horsehoe Lake Mining Co., Ltd..... Midwest Chemical Co..... (a) Muskiki Sulphates, Ltd..... Natural Sodium Products, Ltd..... Oban Salt Co., Ltd..... Saskasal, Ltd..... Sodium Corporation, Ltd..... (a) Sodium Sylphate Co. of Sask., Ltd..... White Shore Salts & Chemicals Co., Ltd.....	831 D. North, Saskatoon..... 513 Loughheed Bldg., Calgary, Alta..... Ormiston..... Palo..... Chinook, Alberta..... Expanse..... Oban..... 513 Westman Chambers, Regina..... 372 Bay St., Toronto, Ont..... 1753 Rose St., Regina..... 1371 George St., North Battleford.....	Viscount. Fusilier. Ormiston. Palo. Muskiki Lake. Frederick Lake. Oban. Watrous. Alsask. Sec. I.T. 4 R. 2 W. 2. White Shore Lake.
---	--	---

(a) Active but no production.

Talc and Soapstone Industry

QUEBEC— Broughton Soapstone and Quarry Co., Ltd... Fortin, Charles..... Pharo, L. C.....	Broughton Station..... Robertsonville..... Thetford Mines.....	Beauce Co. Thetford Tp. Thetford Tp.
ONTARIO— Canada Talc, Ltd..... Gillespie, Geo. H..... Henderson Mines, Ltd..... Fairey and Cuncliffe..... Kennedy, J. J..... Creagh, John.....	Madoc..... Box 232, Madoc..... Madoc..... 660 Taylor St., Vancouver, B.C..... Sooke Lake..... McGillivray Falls.....	Hastings Co. Madoc. Hastings Co. Anderson Lake. Sooke Lake. Anderson Lake.

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

CLAY PRODUCTS INDUSTRY

Brick, Tile, Clay and Sewer Pipe (from domestic clay)

Name	Head office address	Location
NOVA SCOTIA—		
(a) Brooks, Stephen, & Sons.....	Box 359, New Glasgow.....	New Glasgow.
(a) McIntyre, A. D.....	Sydney.....	Sydney.
Miller, Jas. B.....	Elmsdale, Hants Co.....	Barney Brook.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax.....	Lantz Siding, Hants Co.
Standard Clay Products, Ltd.....	St. Johns, Que.....	New Glasgow.
NEW BRUNSWICK—		
Ryan, M., & Son, Ltd.....	Fredericton.....	Fredericton.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax, N.S.....	Chipman.
Tondreau, Jos., & Sons.....	Bathurst.....	Bathurst.
QUEBEC—		
Ascot Tile & Brick Co., Ltd.....	Ascot Corner.....	Richmond Co.
Begin, Olivier.....	R. R. 1, Petite Riviere.....	R. R. 1, Petite Riviere.
Bourbeau, Georges, & Fils.....	R. R. 1, Danville.....	Kingsley Falls.
Brunelle, L. H.....	Box 273, Victoriaville.....	Victoriaville.
Canadian Kaolin Silica Products.....	660 St. Catherine St. W., Montreal.....	St. Remi d'Amherst.
Champlain Brick, Ltd.....	56 Laliberté St., Quebec.....	Beauport East.
Chicoutimi Brick Co., Ltd.....	Chicoutimi.....	Chicoutimi.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	L'Islet Station, Boischatel and Lauzon.
Desmarais, S. E., & Co.....	Richmond.....	Richmond.
Duquette, Isidore.....	Box 626, East Angus.....	Westbury Tp.
Hodges, David T.....	Shawville.....	Clarendon Tp.
Laprairie Co., Inc.....	660 St. Catherine St., W., Montreal.....	Laprairie and Delson.
Gaulin, Evangéliste.....	Princeville.....	Arthabasca.
Montreal Terra Cotta Co., Ltd.....	Dominion Square Bldg., Montreal.....	Lakeside.
Panet Brick Co., Ltd.....	L'Islet Station.....	L'Islet Station.
Parrot, M. H.....	Deschailions.....	Deschailions.
Potvin, Alphonse.....	Deschailions.....	Deschailions.
Richmond Brick Co.....	Richmond.....	Richmond.
Scott Brick and Tile Co., Ltd.....	15 St. Joseph St., Quebec.....	Dorchester Co.
Standard Clay Products, Ltd.....	St. Johns.....	St. Johns.
St. Lawrence Brick Co., Ltd.....	1010 St. Catherine St. W., Montreal.....	Laprairie.
St. Tite Industrial, Ltd.....	St. Tite.....	St. Tite.
ONTARIO—		
Barnes, Wm. R., Co., Ltd.....	243 Cumberland Ave., Hamilton.....	Various.
Barnhardt, W. H.....	Stratford.....	Stratford.
Brampton Pressed Brick Co., Ltd.....	Brampton.....	Chingaucousy Tp.
Broadwell, B., & Son.....	Kingsville.....	Essex Co.
Canadian Pressed Brick Co., Ltd.....	Kenilworth Ave., S., Hamilton.....	Hamilton.
Casemore, R., & Son.....	Shallow Lake.....	Grey Co.
Chapman Bros.....	145 Dawes Rd., Toronto.....	East York Tp.
Construction Materials, Ltd.....	New Toronto.....	York Co.
Cooksville Co., Ltd.....	672 Dupont St., Toronto.....	Cooksville.
Coultis, George, & Son.....	Theford.....	Lambton Co.
Curtin, F., Estate.....	R. R. 4, Lindsay.....	Victoria Co.
Curtis Bros.....	Box 809, Peterboro.....	Otonabee Tp.
Deller, Albert, & Son.....	Brownsville.....	Oxford Co.
Deller Bros.....	R. R. 2, Norwich.....	Oxford Co.
Deller, Wm. H.....	Thorndale.....	W. Nissouri Tp.
Dochart Brick, Tile & Terra Cotta Works.....	Arnprior.....	Arnprior.
Douglas & Douglas.....	Wilkesport.....	Lambton Co.
Dover Brick & Tile Works.....	Chatham.....	Dover Tp.
Donaldson, Thos. Geo.....	R. R. 1, Greenock.....	Culross Tp.
Elliott, James, Jr.....	Sault Ste. Marie.....	Korah Tp.
Elliott, Wm.....	Glenannon.....	Bruce Co.
Fort William Brick Co.....	Fort William.....	Fort William.
Frid Bros., Ltd.....	Main W. and Macklin Sts., Hamilton.....	Hamilton.
Godfrey, Thos., & Co.....	Carleton Place.....	Beckwith Tp.
Gomoll Brick and Tile Works.....	Powassan.....	Himsworth Tp.
Grimsby Brick & Tile, Ltd.....	Grimsby.....	Grimsby.
Hallatt, Miss B. E.....	17 King George's Road, Toronto.....	Tilbury.
Hamilton Pressed Brick Co., Ltd.....	Kensington Ave. S., Hamilton.....	Wentworth Co.
Harper Brick Works.....	348 Greenwood Ave., Toronto.....	York Co.
Hill, Aaron.....	Essex.....	Essex.
Hill, A. W.....	R. R. 1, Coatsworth.....	Tilbury E. Tp.
Hitch, D. A.....	Box 236, Ridgetown.....	Ridgetown.
Hitch, Thomas.....	Box 254, St. Thomas.....	Elgin Co.
Hodder, Mrs. J. H., & Sons.....	Dutton.....	Elgin Co.
Howlett, Fred W., & Sons, Ltd.....	Box 3, Petrolia.....	Petrolia and Brigden.
Huntsville Brick Works.....	Box 308, Huntsville.....	Muskoka.
Interprovincial Brick Co., Ltd.....	672 Dupont St., Toronto.....	Chingaucousy Tp., Nassagaweya Tp.
Jackson, W. B.....	Brantford.....	Brantford.
Jamieson Lime Co.....	Renfrew.....	Renfrew.

DIRECTORY OF FIRMS—Continued

Brick, Tile, Clay and Sewer Pipe (from domestic clay)—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
James, D. A.	Mt. Brydges	Middlesex Co.
Jervis, W. J.	R.R. 3, Dorchester	N. Dorchester.
Johnson, James, Estate	Pembroke	Stafford Tp.
Koebel Bros.	Box 3, St. Clements	Waterloo Co.
Lindsay, Earl, & Sons	R.R. 2, Wallaceburg	Chatham Gore Tp.
McComb, Chester	R.R. 2, London	Middlesex Co.
McCormick Bros.	R.R. 5, Watford	Lambton Co.
McEachran, N., & Son	Highgate	Orford Co.
McFarlane, W. J.	Forest	Forest.
Milton Brick, Ltd.	1158 Bay St., Toronto	Milton.
Moulton, John	R.R. 2, Holyrood	Bruce Co.
Napanee Brick & Tile Works	R.R. 3, Napanee	N. Fredericksburg Tp.
National Fire Proofing Co. of Canada, Ltd.	96 Bloor St. W., Toronto	Aldershot.
National Sewer Pipe Co., Ltd.	Aldershot	Hamilton, Swansea, E. Flamboro Tp.
New Liskeard Brick Works	Box 74, New Liskeard	New Liskeard.
Ontario Brick & Tile Plant (Government)	Provincial Secretary, Parliament Building, Toronto	Mimico.
O'Reilly, Thos.	320 Bay St., Ottawa	Prescott Highway.
Ott Brick & Tile Manufacturing Co., Ltd.	Kitchener	Kitchener.
Ottawa Brick & Terra Cotta Co., Ltd.	Billings Bridge	Gloucester Tp.
Owen Sound Brick Co., Ltd.	Owen Sound	Owen Sound.
Parks Tile Yard	R.R. 2, Dresden	Camden Tp.
Paxton, Fred R.	70 Herrick Ave., St. Catharines	St. Catharines.
Phinn, Geo. A.	Springbank Drive, London	Middlesex Co.
Phippen, H. W., & Son	Dawes Rd., Toronto	East York.
Pougnnet, M. V.	Belle River	Essex Co.
Richardson, J., & Son	Kerwood	Kerwood.
Rollins, D. W.	Belleville	Thurlow Tp.
Snelgrove, A.	Beaverton	Beaverton.
Sproat and Sproat	R.R. 4, Seaforth	Tuckersmith Tp.
Standard Brick Co., Ltd.	500 Greenwood Ave., Toronto	Toronto.
Superior Brick & Tile Co., Ltd.	426 Victoria Ave., Fort William	Paipoonge Tp.
Toronto Brick Co., Ltd.	897 Bay St., Toronto	Don Valley, Toronto, York Tp.
Wagstaff, Chas., Estate of	R.R. 4, Lindsay	Ops Tp.
Wallace, R., & Son	Toronto General Trust Corp., 253 Bay Street, Toronto	Widdifield Tp.
Wein, Aaron	Crediton	Huron Co.
Weitzel, John E.	R.R. 1, Tavistock	Oxford Co.
Wright, Geo., & Sons	Comber	Comber.
MANITOBA—		
Alsip Brick, Tile & Lumber Co., Ltd.	537 Portage Ave., Winnipeg	Winnipeg.
Marion Brick Co.	Box 30, St. Boniface	St. Boniface.
Snyder Brick Yards, Ltd.	Portage la Prairie	Portage la Prairie.
Wardrop, D. M.	Whitmouth	Whitmouth.
SASKATCHEWAN—		
Bruno Clay Works, Ltd.	Bruno	Bruno.
Dominion Fire Brick & Clay Products, Ltd.	Box 99, Moose Jaw	Claybank.
International Clay Products, Ltd.	Estevan	Estevan and Prince Albert.
Malloff & Son	Yorkton	Yorkton.
ALBERTA—		
Acme Brick Co., Ltd.	10526 Jasper Ave., Edmonton	Cannell.
Alberta Clay Products Co., Ltd.	Box 672, Medicine Hat	Medicine Hat.
Gunderson Brick and Coal Co., Ltd.	Redcliff	Redcliff.
Johansen, K.	Box 1722, Grande Prairie	Grande Prairie.
Little, J. B., & Sons, Ltd.	9120-100 Ave., Edmonton	Edmonton.
Medicine Hat Brick & Tile Co., Ltd.	Medicine Hat	Medicine Hat.
Redcliff Premier Brick Co., Ltd.	Redcliff	Redcliff.
(a) Redcliff Pressed Brick Co., Ltd.	Redcliff	Redcliff.
BRITISH COLUMBIA—		
Baker Brick & Tile Co., Ltd.	3191 Douglas St., Victoria	Victoria.
(a) (b) B. C. Refractories, Ltd.	660 Taylor St., Vancouver	Williams Lake, Princeton.
(a) Clayburn Co., Ltd.	850 West Hastings St., Vancouver	Kilgard.
Gabriola Shale Products, Ltd.	1304 Broad St., Victoria	Gabriola Island.
Gorse, Percy A.	Salmon Arm	Enderby.
Haug, Wm., and Son	Box 166, Kelowna	Kelowna.
Port Haney Brick Co., Ltd.	846 Howe St., Vancouver	Port Haney.
Vancouver Brick & Tile Co., Ltd.	Columbia Ave., Vancouver	Sullivan.
Bazan Bay Brick and Tile Co., Ltd.	Bazan Bay, Sidney	Bazan Bay.

(a) Includes production of refractories.

(b) Includes production of bentonite.

DIRECTORY OF FIRMS—Continued

Canadian Producers of Stoneware and Pottery from Domestic Clays

Name	Head office address	Location
NEW BRUNSWICK— (a) Foley Pottery, Ltd.....	Loch Lomond Road, Saint John.....	Saint John.
ONTARIO— Foster Pottery Co.....	Main St. W., Hamilton.....	Hamilton.
ALBERTA— Medalta Potteries, Ltd.....	Medicine Hat.....	Medicine Hat.
BRITISH COLUMBIA— Baker Brick & Tile Co., Ltd.....	3191 Douglas St., Victoria.....	Victoria.

(a) Includes production of refractories.

Cement Industry

QUEBEC— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal.....	Hull and Montreal East.
National Cement Co., Ltd.....	Box 310, Station Hochelaga, Montreal.....	Montreal East.
ONTARIO— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, Que.....	Belleville, Lakefield and Port Colborne.
St. Mary's Cement Co., Ltd.....	357 Bay St., Toronto.....	St. Marys.
MANITOBA— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, Que.....	Fort Whyte and Steep Rock
ALBERTA— Canada Cement Co., Ltd.....	Box 290, Station B, Montreal, Que.....	Exshaw.
BRITISH COLUMBIA— British Columbia Cement Co., Ltd.....	Box 10, Victoria.....	Bamberton and Tod Inlet.
Coast Cement Co., Ltd.....	Granville Island, Vancouver.....	Granville Island.

Lime Industry

NOVA SCOTIA— Dominion Steel & Coal Corp., Ltd.....	Sydney.....	Sydney.
Eastern Lime Co., Ltd.....	Windsor.....	Windsor.
NEW BRUNSWICK— Bathurst Power and Paper Co., Ltd.....	Bathurst.....	Bathurst.
Purdy & Green, Ltd.....	323 Main St., Saint John.....	Saint John.
Randolph & Baker, Ltd.....	Randolph.....	Randolph.
Saint John Lime Co.....	Brookville.....	Brookville.
Snowflake Lime, Ltd.....	3 Pokiok Road, Saint John.....	Saint John.
QUEBEC— Arnaud & Beaudry.....	Joliette.....	Joliette.
Boivin, Arthur.....	Pont Rouge.....	Pont Rouge.
Canada Lime Products Co.....	7403 Drolet St., Montreal.....	St. Vincent de Paul.
Canada Lime & Stone, Ltd.....	St. Marc des Carrières.....	St. Marc des Carrières.
Côté, Xavier.....	Métabetchouan.....	Métabetchouan.
Desfond, Gaspard.....	St. Cuthbert.....	St. Cuthbert.
Dominion Lime Co.....	Lime Ridge.....	Lime Ridge.
Drouin, Eva C.....	St. Justine.....	Dorchester Co.
Filion, Narcisse.....	St. Joachim.....	St. Joachim.
Gagné, Octave.....	St. Ulric.....	St. Ulric.
Héon and Héon.....	St. Louis de France.....	St. Louis de Champlain.
Lalunière, Joseph.....	St. Dominique de Bagot.....	St. Dominique de Bagot.
La Trappe de N. D. de Mistassini.....	Village des Pères.....	Lac St-Jean.
Limoges, Henri.....	552 Poupart St., Montreal.....	St. Michel.
Mercure, C.....	9 rue St. Denis, St. Hyacinthe.....	St. Dominique de Bagot
Shawinigan Chemicals, Ltd.....	Box 2670, Montreal.....	Shawinigan Falls.
Standard Lime Co., Ltd.....	Joliette.....	St. Paul de Joliette, St.
Trottier, David.....	St. Marc des Carrières.....	Marc des Carrières.
Villeneuve, R.....	St. Jérôme.....	St. Marc des Carrières.
ONTARIO— Bell, Harry.....	R.R. 4, Chesley.....	Grey county.
Brown's Lime Works.....	491 Ninth Ave. E., Owen Sound.....	Owen Sound.
Brunner, Mond Canada, Limited.....	Canadian Bank of Commerce Bldg., Toronto	Amherstburg.
Cameron, W. M.....	Carleton Place.....	Carleton Place.
Canada and Dominion Sugar Co., Ltd.....	Chatham.....	Chatham.
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto.....	Guelph.
Dominion Rock Products, Ltd.....	941 Dominion Square Bldg., Montreal.....	Eganville.
Gypsum, Lime & Alabastine Canada, Ltd.....	Paris.....	Beachville, Hespeler and Halton Co.

DIRECTORY OF FIRMS—Continued

Lime Industry—Concluded

Name	Head office address	Location
ONTARIO—Concluded.		
Innerkip Lime & Stone Co., Ltd.	Beachville	Beachville.
Jamieson Lime Co.	Renfrew	Renfrew Co.
Laurentian Stone Co., Ltd.	195 Nicholas St., Ottawa	Ottawa (*)
North American Cyanamid, Ltd.	1901 Royal Bank Bldg., Toronto	Niagara Falls.
Rockwood Lime Co.	Box 46, Rockwood	Eramosa Tp.
Shane Lime Co.	Eganville	Grattan Tp.
MANITOBA—		
Gillis Quarries, Ltd.	Richard & Spruce Sts., Winnipeg	Carson, Poplarfield.
Gypsum, Lime & Alasbastine Can., Ltd.	Paris	Winnipeg.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg	Spearhill, Stonewall.
ALBERTA—		
Canadian Sugar Factories, Ltd.	Raymond	Raymond.
Loders Lime Co., Ltd.	Kananaskis	Kananaskis.
Summit Lime Works	Box 273, Lethbridge	N. Lethbridge.
BRITISH COLUMBIA—		
Lyon, F.	Hedley	Hedley.
Pacific Lime Co., Ltd.	744 West Hastings St., Vancouver	Texada Island.
Pacific Mills, Ltd.	Raymur Ave., Vancouver	Ocean Falls.

(*) Stone quarried in Ontario is calcined in Hull, Quebec.

Sand-Lime Brick Industry

Names of Companies	Location
Canadian Carborundum Company, Ltd.	St. Canut, Que.
Standard Lime Company, Limited	1595 St. Grégoire St., Montreal, Que.
Harbour Brick Company, Limited	Fleet St., Toronto, Ont.
Hinde Bros.	Mont Dennis, Ont.
Toronto Brick Company, Ltd.	Scarboro, Ont.
York Sandstone Brick Company, Ltd.	447 Victoria Park Ave., Toronto, Ont.

Sand and Gravel

(In addition to the names listed below, production has been reported by the Railway Companies for ballast, counties and townships in Ontario for road use and also a considerable amount by companies carrying on dredging operations).

Name	Head office address	Location
NOVA SCOTIA—		
Campbell, M. J.	Boisdale	Boisdale.
McSween, James	Ironville	Ironville.
Mosher, Walter	307 Portland St., Dartmouth	Elmsdale.
Nova Scotia Dept. of Highways	Halifax	Various.
Walker, Alden G.	Bridgetown	Bridgetown.
NEW BRUNSWICK—		
Anderson, A. W.	Fairville	Fairville.
Likely, Jos. A., Ltd.	99-107 Rothesay Ave., Saint John	East Saint John.
Maxwell, Chas. & Son	St. Stephen	St. Stephen.
New Brunswick Dept. of Highways	Fredericton	Various.
QUEBEC—		
Alcoa Power Co., Ltd.	Box 620, Kénogami	Racine.
Audet, Eug. G.	190 rue St. Paul, Quebec	Rivière Ouelle.
Bellevance, Ltée	Amqui	Amqui.
Bigras, Omer	Ste-Rose Ouest	Ste-Rose Ouest.
Bitumen Products Corp.	3590 St. Patrick St., Montreal	Thurso.
Bonner Sand & Ballast, Ltd.	1434 Ste. Catherine St. W., Montreal	Abbotsford, South Durham.
Boulanger, J. R.	Montmagny	Montmagny.
Brouillet Sand & Gravel	Rawdon	St. Julienne.
Canadian Rock Products, Ltd.	Box 159, Quebec	St. André de Kamouraska and Ste. Anne de la Pocatière.
Coaticook, Ville de	100 rue Child, Coaticook	Coaticook.
Consolidated Oka Sand & Gravel Co., Ltd.	248 rue McCord, Montreal	Lac des Deux-Montagnes.
Desmarais & Co.	Richmond	Richmond.
Dumont & D'Amours Engr.	Rivière du Loup Centre	Trois-Pistoles.
Dutrisac, Noël	Ste. Rose, Comté Laval	Ste. Rose.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Continued

Name	Head office address	Location
QUEBEC—Concluded		
Eastern Townships Paving & Contracting Co., Ltd.	Box 234, Sherbrooke.	Lennoxville.
Ferron, Donat.	St. Léon.	St. Léon.
Gagnon, A. & Frère.	Lambton.	Winslow Nord.
Gauthier & Tremblay.	164 rue Racine, Chicoutimi.	Rivière du Moulin.
Gordon, Alfred.	Brigham.	Farnham E. Tp.
Granby, Cité de.	Granby.	Granby.
Langelier, Albert.	St. Victor de Beauce.	Riv. Chaudière.
Langlois, Babin & Michel.	Port Daniel Centre.	New Carlisle.
Laroche, Alexandre.	St. Antoine de Tilly.	St. Antoine de Tilly.
Latulippe, P. & A.	238 rue de la Ronde, Quebec.	St. Charles River.
Magog, Ville de.	Magog.	Katevale.
McCarthy, W. A.	104 St. John St., Quebec.	Abitibi, Malartic.
Mercur, C.	9 rue St. Denis, St. Hyacinthe.	St. Dominique de Bagot.
National Sand & Material, Ltd.	402 Harbour Bldg., Toronto.	Near Montreal.
Normand & Normand.	L'Islet.	L'Islet.
O'Connell, H. J., Ltd.	506-7 Canada Cement Bldg., Montreal.	Témiscamingue Co.
Perron, J. E.	129 rue Cartier, Chicoutimi.	Chicoutimi.
Plante & House.	St. Victor, Beauce Co.	St. Victor.
Poudrier & Boulais.	Black Lake.	Black Lake.
Quebec, City of.	Quebec.	Ste. Thérèse Beauport.
Quebec Dept. of Highways.	Quebec.	Various.
Sable, La Cie de, Ltée.	10-3ème Ave., Limoilou, Quebec.	Rivière St. Charles.
Sherbrooke, City of.	Sherbrooke.	Sherbrooke.
Simard, Célestin.	256 St. Paul St., Quebec.	Métis.
Sorel Harbour Tugs, Ltd.	Sorel.	St. Francis River.
Standard Lime Co., Ltd.	Joliette.	Ste. Emélie.
Standard Sand & Gravel, Ltd.	St. Félix de Valois.	St. Félix de Valois.
Trappe, La, de Mistassini.	Village des Pères, Lac St. Jean.	Village des Pères.
Trudel, Willie.	Nicolet.	Nicolet.
ONTARIO—		
Axford, J. B., & Sons.	35 Elm St., St. Thomas.	St. Thomas.
Barnes, Wm. R. Co., Ltd.	243 Cumberland Ave., Hamilton.	Brantford, Hamilton, Nixon Springvale, Waterdown.
Bellyou, N. E.	R. R. 4, Trenton.	Near Trenton.
Birtch, James A.	Richmond.	Richmond.
Boyd Bros.	Osgoode.	Osgoode.
Brantford, City of.	Brantford.	Brantford.
Butler, M. J.	Bayfield.	Bayfield.
Cameron, Chas. M.	Glencoe.	Glencoe.
Campbell, Jeremiah.	Dashwood.	Dashwood.
Canadian Aggregates, Ltd.	78 Wyandotte St., Walkerville.	Walkerville.
Conlin, Herbert L.	Highland Creek.	Highland Creek.
Consolidated Sand & Gravel, Ltd.	Harbour Commission Bldg., Toronto.	Durham, Fuller, Paris, Waterford.
Connell Bros.	Clinton.	Clinton.
Cross, Albert G.	R. R. 1, Vankleek Hill.	Vankleek Hill, Hensall.
Cudmore, Bertha.	R. R. 6, Thamesville.	Near Thamesville.
Dominion Concrete Co., Ltd.	Van Buren St., Kemptville.	Near Kemptville.
Ferguson, R. W.	72 Pearl St. W., Brockville.	Gananoque.
File, Secord.	43 Port St., Brantford.	Brantford.
Forrester, Wm. E.	Box 201, Morewood.	Morewood.
Foster, R. R.	86 Spadina Ave., Ottawa.	Near Ottawa.
Frid Bros., Ltd.	Main & Macklin Sts., Hamilton.	Hamilton.
Grandmaitre, D.	19 Olmstead St., N., Eastview.	Eastview.
Hall, John B.	Parry Sound.	Parry Sound.
Halpenny, Lewis E.	R. R. 4, Arthur.	Near Arthur.
Hardie, J. T.	Princeton.	Princeton.
Hayden, Thos. & Son.	Cavan St., Port Hope.	Near Port Hope.
Hill, John D.	Woodstock.	Near Woodstock.
Hinde Bros.	134 Northland Ave., Mount Dennis.	Mount Dennis.
Howard Sand & Gravel Co., Ltd.	Aldershot.	Aldershot.
Jago Concrete Products Co.	Summersville.	Summersville.
Johnston, G. T.	R. R. 2, Wilton Grove.	Wilton Grove.
Kingston Sand & Gravel Co., Ltd.	Villa St. Clair Apts., Kingston.	Near Kingston.
Liley, W.	R. R. 6, London.	Near London.
Nevill & Son, Thos.	R. R. 5, Aylmer West.	Aylmer West.
Newell, Herbert.	R. R. 4, Aylmer.	Aylmer.
Ontario Dept. of Highways.	Toronto.	Various.
Page, Jacob A.	R. R. 3, Fenwick.	Fenwick.
Quigley's.	Bartonville.	Waterdown.
Rath, James.	Putnam.	Putnam.
Sanderson, Henry.	Blyth.	Blyth.
Sarjeant Co., Ltd.	49 Dunlop St., Barrie.	Barrie.
Skinner, R.	Exeter.	Exeter.
Smythe, C., Ltd.	60 Carlton St., Toronto.	Near Toronto.
Spratt, J. H.	Billings' Bridge.	Billings' Bridge.
Stevens, J. H.	Stoney Creek.	Stoney Creek.
Stewart, Fenwick.	R. R. 5, Clinton.	Clinton.
Stover, Elmer.	R. R. 4, Tillsonburg.	Tillsonburg.
White, Homer & Co.	Picton.	Picton.
Wilcox, Hervey.	985 Bridge St., Niagara Falls.	Niagara Falls.
Woolatt Fuel & Supply Co., Ltd.	109 Ottawa St., Walkerville.	Walkerville.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Wright & Co.	960 Queen St., Sault Ste-Marie.	Mile 5, A. C. & H. B. Ry. Co.
Yundt, Wm. Construction Co.	Stratford.	Stratford.
Zavitz, Edgar M.	R.R. 2, Ilderton.	Ilderton.
MANITOBA—		
Brandon, City of.	City Hall, Brandon.	Brandon.
Building Products & Coal Co., Ltd.	Christie St., Winnipeg.	Birds Hill.
Cumming & Dobbie.	233-9th St., Brandon.	Brandon.
Cusson, J. A.	St. Boniface.	Ste. Anne.
Greater Winnipeg Water Dist.	183 King St., Winnipeg.	Mile 31 and Mile 60 G.W.W.D. Ry.
Manitoba Dept. of Highways.	Winnipeg.	Various.
McCurdy Supply Co., Ltd.	49 Notre Dame Ave., Winnipeg.	Various.
National Parks Branch.	Ottawa.	Springfield.
Northwest Gravel & Coal Co., Ltd.	604 Great West Perm. Bldg., Winnipeg.	
Provincial Gravel & Coal Co., Ltd.	704 Great West Perm. Bldg., Winnipeg.	
Riley, W. J.	Molson.	
Greater Winnipeg Water Dist.	Rosser.	
SASKATCHEWAN—		
National Parks Branch.	Ottawa.	Various.
North Battleford, City of.	1201 King St., North Battleford.	
Saskatchewan Dept. of Highways.	Regina.	Various.
Spoke, J. C.	Perryvale.	S.W. 26-63-23-W4th.
ALBERTA—		
Alberta Dept. of Highways.	Edmonton.	Various.
Cristall Sand.	10163-104th St., Edmonton.	Perryvale.
Nanton, Town of.	Nanton.	N.W. 15-16-28-W4th.
National Parks Branch.	Ottawa.	Various.
BRITISH COLUMBIA—		
Armstrong, City of.	Armstrong.	Vernon Mining Division.
British Columbia Dept. of Highways.	Victoria.	Various.
British Columbia Sand & Gravel Co., Ltd.	Ste. 19-163 W. Hastings St., Vancouver.	Lynn timer.
Britannia Sand & Gravel Co., Ltd.	1901 West Georgia St., Vancouver.	Britannia Beach.
Burnaby, Corp. of the District of.	Edmonds, New Westminster.	District of Burnaby.
Cascade Rock & Gravel Co., Ltd.	1A-410 Seymour St., Vancouver.	District of North Van- couver.
Chilliwack, City of.	Chilliwack.	Tp. of Chilliwack.
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail.	Tadanac.
Cranbrook, Corp. of the City of.	Cranbrook.	Cranbrook.
Deeks Sand & Gravel Co., Ltd.	101 1st Ave., West Vancouver.	Seymour Creek, North Van- couver & Coquitlam.
Freshwater Sand & Gravel Co., Ltd.	902 Columbia St., W. New Westminster.	Port Coquitlam.
Gilley Bros., Ltd.	902 Columbia St., W. New Westminster.	Port Coquitlam.
Hillside Sand & Gravel, Ltd.	1075 Main St., Vancouver.	Hillside, Howe Sound.
Kamloops, Corp. of the City of.	Box 360, Kamloops.	Kamloops.
National Parks Branch.	Ottawa.	Various.
Nelson, City of.	Box 140, Nelson.	Nelson-Trail Creek T.P. 23, L. 304 Rosemont.
Port Coquitlam, City of.	Port Coquitlam.	New Westminster Dist.
Prince Rupert, City of.	City Hall, Prince Rupert.	Prince Rupert.
Producers Sand & Gravel Co. (1929), Ltd.	1902 Store St., Victoria.	Royal Bay.
Revelstoke, City of.	Revelstoke.	Revelstoke.
Trail, City of.	Trail.	Trail.
West Kootenay Power & Light Co., Ltd.	Trail.	Kootenay District.

Stone Quarrying Industry

Granite

NOVA SCOTIA—		
Bower, A. R.	Box 255, Shelburne.	Birchtown.
(*) Dauphinee, W. T.	Shelburne.	Birchtown and Queensport.
(*) Rice Bros.	Lawrencetown.	
(*) Rice, W. D.	Middleton.	
NEW BRUNSWICK—		
(*) Granite Street Pavement & Construction Co., Ltd.	Hampstead.	Hampstead.
Holt and Spinney.	St. George.	Digdeganash.
(*) Milne, Coutts & Co., Ltd.	St. George.	St. George.
(*) Mooney, B., & Son Realty, Ltd.	49 Canterbury St., Saint John.	Hampstead.
New Brunswick Department of Highways.	Fredericton.	Various.
(*) O'Brien & Baldwin.	St. George.	St. George.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Granite—Concluded

Name	Head office address	Location
QUEBEC—		
Alcoa Power Co., Ltd.	P.O. Box 620, Kénogami	Racine.
B. & R. Granite Quarry	Beebe	Beebe.
(*) Bernier and Sons	Box 491, Roberval	Rang St. Dominique Roberval.
Bérubé, Lucien	Brownsburg	Chatham Tp.
Bourbonnais, J. A.	Vaudreuil Station	Rigaud.
(*) Brodie's, Ltd.	1070 Bleury St., Montreal	Stanstead, Iberville and Labelle Counties.
Brunet, Joseph	4411 Chemin Côte-des-Neiges, Montreal	Chatham Tp.
(*) Bussièrre, A. L.	St. Sébastien	St. Cécile.
Chicoutimi, City of	Chicoutimi	Chicoutimi.
(*) Clausen, Julius	Brownsburg	Brownsburg.
(*) Cloutier, R. L.	Beebe	Beebe.
(*) Delwaide, Anselme	Chicoutimi	Simard Tp.
Desbiens, J. Raoul	St. Hébertville Station	Laurentian Park.
Desrosiers, Albert	Beebe	Beebe.
Dontigny, Alphonse	Shawinigan Falls	Shawinigan Falls.
(*) Dumas, Arthur, & Co., Engr.	Rivière à Pierre	Bois Tp.
(*) Gingras & Frère, Ltée.	St. Marc des Carrières	Stanhope.
Gosselin, Oscar	Lac Mégantic	St. Sébastien.
(*) Granit Noir Canadien, Engr.	St. Joseph d'Alma	Roberval.
Grenier, E.	Glenada	Glenada.
Guenette Granite Co., Ltd.	Guenette	Campbell Tp.
(*) Haselton, Wm. M.	Box 68, Beebe	Stanstead.
Jonquière, Ville de	Jonquière	Jonquière.
Lacasse and Boulais	Box 23, Beebe	Beebe.
La Cie Routière Lac St. Jean Chicoutimi	Box 448, Roberval	Jonquière.
(*) Le Granit National, Ltée.	Box 276, Roberval	St. Gédéon.
Lemay Contracteur, Ltée.	Landrienne	Sullivan Gold Mines.
Levesque, Armand	Roberval	Métabetchouan.
McIntosh, Robert	Beebe	Beebe, Stanstead Co.
(*) Nett, Olson, Hokanson & Henrikson	Beebe	Graniteville.
Perron, J. S.	Rivière à Pierre	Bois Tp.
Quebec Department of Highways	Quebec	Various.
Roy, Alfred	Amos	"Perron Gold Mines".
(*) Scotstown Granite Co., Ltd.	Scotstown	Compton Co.
Shawinigan Falls, City of	Shawinigan Falls	Almaville.
(*) Silver Granite Co., Ltd.	180 Côte d'Abraham, Quebec	St. Samuel Station.
St. Bruno Quarry & Paving Co., Ltd.	636 Querbes Ave., Outremont	St. Bruno.
(*) Stanstead Granite Quarries Co., Ltd.	Beebe	Graniteville.
(*) Voyer, F., et Frère	Rivière à Pierre	Rivière à Pierre.
Villeneuve, G.	Pointe-au-Pic	Baie St. Paul.
Ward, J.	359 Place Youville, Montreal	Brownsburg.
(*) Wilkinson, Frank L.	Beebe	Stanstead Co.
ONTARIO—		
(*) Building Products, Ltd.	Box 2529, Montreal, Que.	Verona and Mountain Grove.
Fort William, City of	Fort William	Fort William.
(*) Horne, Wm	Butler, via Ignace	Butler.
Ontario Rock Co., Ltd.	320 Bay St., Toronto	Belmont Tp. and Methuen Tp.
MANITOBA—		
(*) Winnitoba Marble Co., Ltd.	1180 Wall St., Winnipeg	Hawk Lake.
BRITISH COLUMBIA—		
(*) B. C. Monumental Works, Ltd.	27 Kingsway, Vancouver	Granite Island.
Canadian Marble and Granite Works, Ltd.	101st St., Edmonton, Alta.	Marble Head.
Canadian National Railways	C.N.R. Station, Vancouver	Pitman, Copper Creek.
Canadian Pacific Railway Co.	Montreal, Que.	Maharg.
Coast Quarries, Ltd.	1840 Georgia St. W., Vancouver	Granite Falls.
Gilley Bros., Ltd.	902 Columbia St. W., New Westminster	Coquitlam Municipality.
Nelson, City of	Nelson	Trail Creek Tp.
(*) Nelson Granite and Monumental Co.	Box 865, Nelson	Nelson.
Prince Rupert, City of	Prince Rupert	Prince Rupert.
(*) Vancouver Granite Co., Ltd.	1007 Royal Bank Bldg., Vancouver	Nelson Island.
(*) Vernon Granite & Marble Co.	Okanagan Landing	Osoyoos Mining Div.
(*) Wilson, James S.	Sirdar	Sirdar.
Limestone		
NOVA SCOTIA—		
Eastern Lime Co., Ltd.	Windsor	Windsor.
MacLean & Co.	Oxford	Nappan.
Mersey Paper Co., Ltd.	Liverpool	East River.
Nova Scotia Dept. of Agriculture	Halifax	Various.
NEW BRUNSWICK—		
Brookville Manufacturing Co., Ltd.	Brookville	Brookville.
New Brunswick Department of Highways	Fredericton	Various.
Randolph & Baker, Ltd.	Randolph	Randolph.
Snowflake Lime, Ltd.	3 Pokiak Road, Saint John	St. John.

DIRECTORY OF FIRMS—Continued

Limestone—Continued

Name	Head office address	Location
QUEBEC—		
Archibald Quarry	28½ St. Joseph St., Quebec	Chateau Richer.
Baillargeon & Faubert	62 Union Bldg., St. Lambert	Caughnawaga.
(*) Beaudry, J. Fitre	41 Tache St., Joliette	Joliette.
Boily, Albert	Baie St. Paul.	Baie St. Paul.
Boivin, Ladislav	Baie St. Paul.	Baie St. Paul.
Canada Cement Co., Ltd.	Box 290, Station B., Montreal	Montreal E. and Hull.
Carrière du Cap St. Martin Enrg.	4740 Iberville St., Montreal	Montreal.
Cerole Agricole de St. Godfroy	636 Querbes St., Outremont	Cap St. Martin.
Chenel, Rev. J. E.	St. Godfroy	St. Godfroy.
Côté & Gendreau	Port Daniel	Port Daniel.
Delisle, E.	St. Pierre, Ile d'Orleans.	Ile d'Orleans.
(*) Deschambault Quarry Corp.	Pont Rouge	Pont Rouge.
Dominion Lime Co.	52 St. Pierre St., Quebec	St. Marc des Carrières.
Drouin, Eva Cimon	Lime Ridge	Lime Ridge.
Dufresne Construction Co., Ltd.	Ste. Justine	Ste. Justine.
Durocher, Cyrille	1832 Blvd. Pie IX, Montreal	Rivière des Prairies.
Faubert, Alphonse	11021 Notre Dame E., Montreal	Montreal E.
Fontaine, Omer	De Léry	Ville de Léry.
Francoeur, J. Baptiste	St. Maurice	St. Maurice.
Fuger & Smith, Ltd.	Kelly	Kelly.
Gagné, Octave	Pointe Claire	Pointe Claire.
(*) Gauthier, Olivier	St. Ulric	Matane Co.
(*) Gauthier, René	St. Marc des Carrières	St. Marc des Carrières.
(*) Gingras et Frère, Ltée.	Village Bélanger	Village Bélanger.
Gravel, Edouard Lazare	St. Marc des Carrières	St. Marc des Carrières.
Kennedy Construction Co., Ltd.	Château Richer	Château Richer.
Laberge & Marchand	407 McGill St., Montreal	Actonville.
Lacoulne, T.	Box 63, Châteauguay Bassin.	Châteauguay.
Lagacé, Napoléon	Château Richer	Château Richer.
(*) Lapointe, A. & E.	St. Martin	St. Martin.
Lapointe, Emile	12034 Lachapelle St., Montreal	Cartierville.
Laurentian Stone Co., Ltd.	St. Dominique de Bagot	St. Dominique de Bagot.
Laurendeau & Cie, Ltée.	195 Nicholas St., Ottawa, Ont.	Wrightville, Hull.
Leclerc, J. J.	16 St. James St. W., Montreal	Lachute.
Leclerc & Robitaille	Rimouski	Rimouski.
(*) Leclerc, Victor	Roberval	Roberval.
Leger and Charlton, Ltd.	6858 St. Denis St., Montreal	Cap St. Martin.
Levesque, Armand	400 Notre Dame St., Lachine	Lachine.
Marcel Quarry, Ltd.	Roberval	Roberval.
(*) Martineau & Sons, Ltd.	St. Michel Station	St. Clothilde de Châteauguay
Matthew Devito Construction, Ltd.	517 E. Marie-Anne St., Montreal	Montreal, Masson.
Meureux, C.	6138 Hamilton St., Montreal	Pointe Claire.
Miner, R. H., Co., Ltd.	St. Hyacinthe	St. Dominique de Bagot.
National Quarries, Ltd.	7411 Delanaudière St., Montreal	St. Laurent.
Naud, Oscar	6301 Park Ave., Montreal	Laval Co.
(*) Noel, Oscar	Lachevrotière	St. Marc des Carrières.
(*) Pagé, Joseph	44 Wright St., Hull	Wrightville, Hull.
(*) Paquette, Lévis & Co.	Charlesbourg	Charlesbourg.
Quebec Department of Highways	Cap St. Martin	Cap St. Martin.
Rousseau, T. E.	Quebec	Various.
(*) Schetagne, Wilfrid	48 Second Ave., Quebec	Val Brilliant.
Shawinigan Chemicals, Ltd.	309 Bord du Lac, Pointe Claire	Pointe Claire.
St. Barthélemi Quarry	Box 2670, Craig St. Station, Montreal	Bedford.
St. Joachim, Municipality of	St. Barthélemi Village	St. Barthélemi.
St. Maurice Quarry, Ltd.	St. Joachim	St. Joachim.
St. Onge, O. F.	307 Alexandre St., Three Rivers	St. Louis de France.
(*) St. Vincent de Paul Penitentiary	St. Dominique de Bagot	St. Dominique de Bagot.
Société Coopérative Agricole	St. Vincent de Paul	St. Vincent de Paul.
Standard Lime Co., Ltd.	St. Jules de Maria	St. Jules de Maria.
Standard Clay Products, Ltd.	Joliette	Joliette.
Trappist Fathers	St. Johns	St. Johns.
Tremblay, Napoléon	Village des Pères	Mistassini.
Trudel, Napoléon, & Fils	31 Joffre Ave., Hull	Hull.
Valleyfield, City of	St. Irénée	St. Famille.
(*) Verreault, E., Ltd.	Valleyfield	Nouveau Salaberry.
Vincelette, Paul	194 Bridge St., Quebec	Gifford.
Warren and Simard Inc.	St. Honoré	Picoutimi.
Wright Crushed Stone Co., Ltd.	Pointe-au-Pic	Pointe-au-Pic.
(*) Wallace Sandstone Quarries, Ltd.	Hull	Wrightville.
	1135 Beaver Hall Hill, Montreal	Phillipsburg.
ONTARIO—		
Billie, Chas.	Box 1185, Smiths Falls	Perth.
Bourgie, J. B.	Box 50, Embarras	Russell Co.
Brunner, Mond Canada, Ltd.	Canadian Bank of Commerce Bldg., Toronto	Essex Co.
Canada Cement Company, Ltd.	Box 290, Station B., Montreal, Que.	Point Anne.
Canada Crushed Stone Corp., Ltd.	Sun Life Bldg., Hamilton	Wentworth Co., & Hagersville.
Canadian Gypsum Co.	1221 Bay St., Toronto	Guelph.
Coldwater Crushed Stone, Ltd.	Coldwater	Coldwater.
Decewville Crushed Stone Co., Ltd.	52 Elgin St., Hamilton	Haldimand Co.
Department of National Defence	Barriefield	Barriefield.
Dibblee Construction Co., Ltd.	246 Albert St., Ottawa	Hastings Co.
Fergus Quarry	Fergus	Fergus.

DIRECTORY OF FIRMS—Continued

Limestone—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Foster, R. R.	86 Spadina Ave., Ottawa	Carleton Co.
Grenon, Joseph	Casselman	Casselman.
Gypsum, Lime and Alabastine, Canada	Paris	Oxford Co. & Halton Co.
Hagersville Quarries, Ltd.	Hagersville	Hagersville.
Haldimand Quarries & Construction, Ltd.	Hagersville	Hagersville.
Innerkip Quarries, Ltd.	Fleet and Bathurst Sts., Toronto	Innerkip.
Jamieson Lime Co.	Renfrew	Renfrew.
(*) Kingston Penitentiary	Kingston	Portsmouth.
Kirby, T. Sidney, Co., Ltd.	215 Sussex St., Ottawa	Gloucester.
Kirkfield Crushed Stone, Ltd.	Fleet and Bathurst Sts., Toronto	Kirkfield.
Lally, Mary F.	Box 39, Smithville	Smithville.
Lapierre, M. C.	9 Ave. E., Owen Sound	Grey Co.
Law Construction Co.	225 Sterling Road, Toronto	Owen Sound.
Limestone Products, Ltd.	1104 Hermand Bldg., Toronto 2	North Orillia Tp.
McGinnis & O'Connor	412 King St., Kingston	Collins Bay.
Noranda Mines, Ltd.	804 Royal Bank Bldg., Toronto	Haileybury.
North American Cyanamid Co., Ltd.	1901 Royal Bank Bldg., Toronto	Beachville.
Pembroke, Town of	Pembroke	Pembroke.
Pirson, John	Stevensville	Stamford.
Puslinch Quarry, Ltd.	Sun Life Bldg., Hamilton	Puslinch.
(*) Queenston Quarries, Ltd.	Sun Life Bldg., Hamilton	St. Davids.
Routly Construction Co.	21 Dundas Square, Toronto	Hastings Co.
Walker Bros., Ltd.	Box 586, Thorold	Stamford Tp.
Wehman, John	23 Plum St., Kingston	Kingston.
Welland Ship Canal	St. Catharines	Welland Canal.
Wilford, F. R., & Co., Ltd.	Lindsay	Victoria Co.
Windmill Point Crushed Stone Co., Ltd.	225 Sterling Road, Toronto	Ridgeway.
NOTE.—In addition to the above, counties, townships and the Department of Highways reported production.		
MANITOBA—		
(*) Gillis Quarries, Ltd.	Richard and Spruce Sts., Winnipeg	Garson & Poplar Field.
(*) Tyndall Quarry Co., Ltd.	1591 Erin St., Winnipeg	Garson.
(*) Western Stone Co., Ltd.	401 Royal Bank Bldg., Winnipeg	Garson.
Winnipeg, City of	Winnipeg	Sony Mountain.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg	Spearhill & Stonewall.
ALBERTA—		
Loder's Lime Co., Ltd.	Kananaskis	Kananaskis.
Summit Lime Works	Box 273, Lethbridge	Lethbridge.
BRITISH COLUMBIA—		
B.C. Department of Highways	Victoria	Various.
Beale, F. J., Lime Stone Quarry	Van Anda	Van Anda.
British Columbia Pulp & Paper Co., Ltd.	Bank of Nova Scotia Bldg., Vancouver	Quatsino Sound.
Canadian Pacific Ry. Co.	Montreal, Que.	Glenogle.
Christensen and Clozza	Namtu	Koeve River.
Deeks Sand & Gravel Co., Ltd.	101 First Ave. W., Vancouver	Seymour Creek, N. Vancouver & Coquitlam.
Pacific Lime Co., Ltd.	744 West Hastings St., Vancouver	Texada Island.
Priore & Vannucchi	Box 315, Trail	Fife.
Roadstone Quarries, Ltd.	1A, 410 Seymour St., Vancouver	Burrard Inlet.
Trail, City of	Trail	Trail.
Canada Lime Co., Ltd.	Chilliwack	Popkum.

Marble

QUEBEC—		
Andorno, Jean Emmanuel	Cap St. Martin	Cap St. Martin.
Canada Marble and Lime Co.	4095 St. Catherine St., Westmount	Lobelle Co.
(*) Wallace Sandstone Quarries, Ltd.	1135 Beaver Hall Hill, Montreal	Phillipsburg.
White Grit Co.	Hurdman Road, Ottawa, Ont.	Portage du Ford:
ONTARIO—		
Bolender Bros.	Haliburton	Haliburton.
Bonter Marble & Calcium Co., Ltd.	Box 61, Marmora	Hastings Co.
Ontario Chemical Minerals	17 Garnock Ave., Toronto	
Orser, S.	Verona	Verona.
Rock Construction Co.	328 Dupont St., Toronto	Bancroft.
Silvertone Black Marble Quarries	305 O'Connor St., Ottawa	St. Albert.
MANITOBA—		
Winnitoba Marble Co., Ltd.	1180 Wall St., Winnipeg	Fisher Branch (Railroad).
BRITISH COLUMBIA—		
Canadian Marble & Granite Works, Ltd.	10702-101st St., Edmonton, Alta.	Marblehead.
B.C. Fine Stone Co.	507 Elllice St., Victoria	Langford.

DIRECTORY OF FIRMS—Concluded

Sandstone

Name	Head office address	Location
NOVA SCOTIA—		
Fairview Crushed Stone Co., Ltd.....	609 Gottingen St., Halifax.....	Halifax.
N.S. Department of Highways.....	Halifax.....	Various.
Wallace Sandstone Quarries, Ltd.....	1135 Beaver Hall Hill, Montreal.....	Wallace.
NEW BRUNSWICK—		
(*) Read Stone Co., Ltd.....	Box 549, Sackville.....	Stonehaven.
(*) Smith, E. A.....	Shediac.....	Shediac.
(*) National Trust Co., Ltd. (a).....	225 St. James St., Montreal.....	Northumberland Co.
QUEBEC—		
Beauharnois Light, Heat & Power Co.....	405 Power Bldg., Montreal.....	Beauharnois.
Blais, Jos., Reg.....	10 Mont Marie Ave., Lévis.....	Lévis Co.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	Lauzon.
Lemieux, Ludger.....	126 Rue St. Pierre.....	Mount Louis.
Montpetit, Euclide.....	Melocheville.....	Melocheville.
Quebec Department of Highways.....	Quebec.....	Various.
Rousseau, T. E.....	48 Second Ave., Quebec.....	Matane Co.
Sherbrooke, City of.....	Sherbrooke.....	Sherbrooke.
Vézina, Jos., Reg.....	Ste. Foye.....	Ste. Foye.
ONTARIO—		
Campbell Sandstone Quarries, Ltd.....	143-163 Main St., Westboro.....	Bells Corners.
Corner, Austin.....	Terra Cotta.....	Peel Co.
Mountain Sandstone Quarry.....	Box 400, Georgetown.....	Georgetown.
McAlpine Bros.....	Milton.....	Halton Co.
Norrie & McHarg.....	R.R. 4, Acton.....	Acton.
Norton, A. W., Stone Quarries.....	Limehouse.....	Glen Williams.
Sykes, Thos.....	Georgetown.....	Georgetown.
Terra Cotta Quarries.....	Glen Williams.....	Glen Williams.
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Kimberley.
(*) McDonald, J. A., & C. H., Ltd.....	1571 Main St., Vancouver.....	Hattington's Gabriola Islands.

(a) Receiver for Miramichi Quarry Co., Ltd.

Slate

QUEBEC—		
Broughton Soapstone & Quarry Co., Ltd.....	Broughton Station.....	Ste. Thérèse.
ONTARIO—		
(*) Canadian Slate Products, Ltd.....	11 King St. W., Toronto.....	Madoc.
Crespy Slate Products, Ltd.....	Drawer 891 Station F., Toronto.....	Madoc.
BRITISH COLUMBIA—		
Kennedy, J. J.....	Sooke Lake.....	Sooke Lake.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

INDEX

A	PAGE		PAGE
Abrasives, artificial.....	180	Auriferous quartz mining industry.....	58
Abrasives, natural (including data on corundum, diatomite, garnets, grindstones, grinding pebbles, pulpstones, sharpening stones and volcanic dusts).....	176	Capital.....	64
Capital.....	178	Costs.....	64
Employment.....	27, 178	Employment.....	27, 65
Exports.....	181	Fuel and electricity.....	30
Fuel and electricity.....	30	Number of plants.....	63
Imports.....	181	Ores, concentrates and slags shipped.....	63
Number of firms.....	21	Ores mined, milled and crude bullion produced.....	63, 64
Power.....	38	Power employed.....	36
Principal statistics.....	21, 178	Principal statistics.....	20
Production.....	8, 178	Wage-earners.....	27, 65
Wage-earners.....	27, 178		
Accidents.....	39	B	
Actinolite.....	213	Barium.....	116
Alberta.....	25	Barytes.....	214
Capital.....	25	Consumption.....	215
Employment.....	26	Imports.....	214
Fuel and electricity.....	34	Production.....	8, 214, 215
Number of plants.....	25	Base Metals Mining Corp.....	74
Power employed.....	36	Bauxite.....	112, 114, 144
Principal statistics.....	25	Bentonite (See under clay)	
Production.....	7, 14, 18	Beryllium.....	116
Wage-earners.....	26	Big Missouri Mine.....	61
Albite.....	189	Bismuth.....	7, 117
Aldermac mine.....	66	Method of computing value.....	268
Alluvial Gold Mining Industry.....	57	World production.....	117
Capital.....	58	Bituminous sands.....	215
Employment.....	27	Production.....	8, 216
Fuel and electricity.....	30	Black Donald Graphite Co. Ltd.....	217
Number of operators.....	58	Bralorne Mine.....	62
Power employed.....	36	Brick, building.....	243
Principal statistics.....	20	Production.....	9, 243
Report of Cold Commissioner of Yukon.....	57	Brick, paving.....	9, 243
Value of shipments.....	58	Brick, sand-lime.....	257
Wage-earners.....	27	Brick and tile.....	9
Alumina.....	113	Principal statistics.....	23
Aluminium.....	112	Bridge river area.....	62
Exports.....	113	Britannia mine.....	74
Imports.....	113	Britannia Mining and Smelting Co. Ltd.....	67
World production.....	114	British Columbia.....	26
World production of bauxite.....	114	Capital.....	26
Aluminium Company of Canada.....	112	Employment.....	26
Anhydrite.....	193	Fuel and electricity.....	34
Antimony.....	115	Number of plants.....	26
Consumption.....	115	Power employed.....	36
Imports.....	115	Principal statistics.....	26
Prices.....	13	Production.....	7, 14, 18
Production.....	115	Review.....	57, 67, 74, 147
World production.....	116	Wage-earners.....	26
Anyox section.....	67	British Metals Corp.....	73
Apatite.....	223	Brunner, Mond Canada, Ltd.....	204
Arsenic.....	77		
Exports.....	78	C	
Imports.....	78	Cadmium.....	7, 118
Method of computing value.....	268	Caesium.....	119
Prices.....	13	Calcium.....	119
Production.....	7, 78	Canada.....	20
World production.....	79	Accidents.....	39
Artificial gas.....	160	Capital.....	24
Arvida plant.....	112	Commodity exchange.....	81
Asbestos.....	181	Employment.....	26, 27
Capital.....	185	Exchange.....	12
Employment.....	27, 86	Exports (see individual minerals)	
Exports.....	187	Fuel and electricity.....	30, 34
Fuel and electricity.....	30	Imports (see individual minerals)	
Imports.....	183, 187	Mineral production values.....	7, 14
Insulation.....	265	Number of operating mines.....	26
Manufactures.....	187	Percentage of production by provinces.....	15
Number of mines.....	21	Power employed.....	36
Power employed.....	38	Prices, metal.....	13
Principal statistics.....	21	Principal statistics.....	20
Production.....	8, 186	Production.....	7, 14
Shipments.....	186	Wage-earners.....	27
Supplies purchased.....	42	Canadian Copper Refiners Ltd.....	145
Wage-earners.....	27, 186	Canadian Gypsum Co.....	193
World production.....	188	Canadian Industries Ltd.....	204
Uses.....	185	Capital employed (also under individual industries).....	24
Asphalt (see Bituminous Sands)			
Atlin District.....	57		

INDEX—Continued

	PAGE		PAGE
Cariboo district.....	57, 61	Copper.....	101
Cement.....	234	Consumption.....	104
Capital.....	235	Exports.....	105
Consumption.....	236	Imports.....	105
Employment.....	27, 236	Method of computing value.....	268
Exports.....	236	Ore reserves.....	106
Fuel and electricity.....	30	Prices.....	13, 105
Imports.....	237	Production.....	7, 103, 104
Kilns used.....	38	World production.....	106
Power employed.....	23	Copper-gold-silver mining industry.....	65
Principal statistics.....	9, 237	Capital.....	67
Production.....	237	Employment.....	27, 68
Sales.....	27, 236	Equipment and supplies purchased.....	42
Wage-earners.....	237	Fuel and electricity.....	33
Cement Products Industries.....	237	Number of plants.....	68
Central Manitoba mine.....	60	Ore mined and milled.....	69
Chromite.....	119	Power employed.....	36
Imports.....	120	Principal statistics.....	20
Production.....	120	Shipments.....	68
World production of chrome ore.....	120	Wage-earners.....	27, 68
Chromium.....	120	Copper Cliff.....	145
Cinnabar (see mercury)		Copper sulphate.....	103
Clay and Clay Products, including data for fire-clay, fireclay blocks and shapes, brick made by different processes, structural tile, drain tile, sewer pipe and pottery.....	238	Corundum.....	175
Capital.....	239	Creighton mine.....	96
Employment.....	27, 240	Crushed stone.....	262
Exports.....	246	Cryolite.....	113
Fuel and electricity.....	30	Cuniptau mines.....	146
Imports.....	246	Curbstone.....	262
Number of plants.....	23		
Power employed.....	38	D	
Principal statistics.....	23	Deloro Smelting and Refining Co.....	77, 79, 117, 146
Production.....	9, 241	Diatomite.....	176
Production from imported clays.....	247	Production.....	8, 179
Supplies purchased.....	42	Dolomite.....	27
Wage-earners.....	27, 241	Dome mine.....	41
World production.....	247	Dominion Salt Co.....	204
Clay products and other structural materials, including cement, clay and clay products, lime, sand and gravel, sand-lime brick, slate and stone.....	233	Dominion Steel and Coal Co.....	121
Consumption.....	234	Drain tile.....	244
Exports.....	234		
General review.....	234	E	
Imports.....	234	Eldorado gold mines.....	76, 146
Production (See cement, clay and clay products, lime, sand and gravel, sand-lime brick, slate and stone).....	150	Electricity (see fuel and electricity).....	30
Coal mining.....	151	Employment (also see under individual industries).....	26
Capital.....	151	Epsom salts.....	221
Consumption.....	157	Equipment—Purchases of.....	40
Disposition.....	153, 154	Eustis mine.....	65
Employment.....	27, 152	Exchange table for Canadian and U.S. dollar.....	12
Exports.....	156	Exchange quotations.....	12
Fuel and electricity.....	30		
Imports.....	155, 156	F	
Number of mines.....	153	Falconbridge Nickel Mines Ltd.....	97, 107
Power employed.....	36	Feldspar.....	8, 188
Principal statistics.....	21	Feldspar and quartz mining industry.....	188
Production.....	8, 152, 153	Capital.....	189
Shipments.....	154	Consumption.....	190
Supplies purchased.....	42	Employment.....	27, 189
Wage-earners.....	27, 152	Exports.....	190
World production.....	158	Fuel and electricity.....	30
Coal mining, Coke, Natural Gas, Peat and Petroleum Industries in Canada.....	150	Imports.....	190
Cobalt.....	79	Number of mines.....	22
Method of computing value.....	268	Power employed.....	38
Exports.....	80	Production.....	8, 190
Prices.....	13	Wage-earners.....	27, 190
Production.....	7, 80	World production.....	191
World production.....	80	Ferro-alloys.....	126
Coke.....	160	Ferrocchrome.....	119
Exports.....	161	Ferosilicon.....	127
Imports.....	161	Firebrick.....	9, 245
Principal statistics.....	161	Production, from domestic clays.....	9, 245
Production.....	161	Fireclay.....	245
Columbium.....	121	Production.....	9, 245
Coniston plant.....	145	Firebrick and other fireclay products.....	245
Coniaurum mine.....	47	Principal statistics.....	245
Consolidated Copper and Sulphur Co., Ltd.....	65	Fireclay blocks and shapes.....	245
Consolidated Mining and Smelting Co. of Canada, Ltd.....	61, 67, 70, 74, 88, 117, 147	Production.....	9, 245
Construction contracts.....	233	Flint (see quartz).....	66, 70, 74
		Floor tile.....	9
		Fluorspar.....	8, 216
		Frood mine.....	145

INDEX—Continued

Fuels (See coal mining, coke, natural gas, peat, and petroleum industries).....	20
Fuel and electricity (Also under individual industries).....	30, 34
Fuel oil.....	170, 173
Fuels (and other non-metals).....	150
General review.....	150

G

Garnets.....	176
Gasoline.....	170, 173
General Review.....	5
General statistics.....	20
Glauber's salts.....	232
Goderich Salt Co.....	204
Gold.....	46
Alberta.....	7, 46, 50
British Columbia.....	7, 46, 50, 61
Canada.....	7, 46, 49, 52
Consumption.....	55
Exports.....	53
Imports.....	53
Manitoba.....	7, 46, 50, 60
Method of computing value.....	268
Monetary stocks.....	56
Nova Scotia.....	7, 46, 50, 59
Ontario.....	7, 46, 50, 51, 60
Production by mines.....	47
Quebec.....	7, 46, 50, 59
Prices by months.....	54
Receipts at the Royal Mint.....	55
Reserves.....	55
Saskatchewan.....	61
Sources.....	52
World production.....	51, 52
Yukon.....	7, 46, 50, 62
Gold Mining Industry.....	43
Alluvial gold mining.....	20, 57
Auriferous quartz mining.....	20, 58
Copper-gold-silver mining.....	20
Equipment purchased.....	42
Granby Consolidated Mining, Smelting and Power Co.....	67
Granite.....	260, 267
Production.....	260
Graphite, natural.....	217
Consumption.....	219
Exports.....	218
Imports.....	218
Production.....	8, 218
World production.....	219
Grinding pebbles.....	177
Grindstones.....	177
Production.....	8, 179
Gunnar gold mine.....	60
Gypsum.....	193
Consumption.....	196
Capital.....	194
Employment.....	27, 195
Fuel and electricity.....	30
Insulation.....	265
Number of mines.....	22
Power employed.....	38
Principal statistics.....	22
Products industry.....	196
Production.....	8, 195, 196
Wage-earners.....	27, 195
World production.....	197
Gypsum Lime and Alabastine Co.....	193
Gypsite (see Gypsum).....	

H

Half Year Production.....	11
Hedley camp.....	62
Helen mine.....	121
Hematite.....	121
Hollinger mine.....	47
Horne mine.....	59, 65, 66
Howey mine.....	47
Hudson Bay Mining and Smelting Co.....	66, 70

	I	PAGE
Ilmenite.....		139
Imported clay products industry.....		247
Capital.....		247
Employment.....		247
Production.....		247
Imports and exports (see various products)		
Insulation.....		265
International Nickel Co. of Canada, Ltd.....	97, 107,	145
Iridium.....		109
Iron ore.....		121
Exports.....		121
Imports.....		121
Shipments.....		121
World production.....		122
Iron and Steel.....		122
Iron oxides.....		187
Capital.....		198
Employment.....		198
Exports.....	27,	198
Fuel and electricity.....		30
Imports.....		199
Number of mines.....		22
Power employed.....		38
Principal statistics.....		22
Production.....		8, 199
Wage-earners.....	27,	198

K

Kaolin.....	9, 244
Keno Hill.....	75
Kerosene.....	173
Kirkland Lake area.....	60
Klondike river district.....	58

L

Lake Shore mine.....	47
Lamaque mine.....	59
Land plaster (see Gypsum)	
Larder Lake.....	60
Lead (See silver-lead-zinc mining).....	38
Consumption.....	89
Exports.....	89
Imports.....	89
Method of computing value.....	268
Prices.....	13, 90
Production.....	7, 88
Refined lead produced in Canada.....	89
World production.....	90, 91
Lime.....	248
Capital.....	249
Consumption.....	252
Employment.....	27, 249
Exports.....	252
Fuel and electricity.....	30
Imports.....	252
Power employed.....	38
Principal statistics.....	24
Production.....	9, 250, 251
Wage-earners.....	27, 250
Limestone.....	261, 267
Production.....	261
List of publications..... (inside front and back covers)	
Lithium minerals.....	129
Lubricating oil.....	173

M

Magnesite (Magnesitic-Dolomite).....	219
Consumption.....	221
Exports.....	220
Imports.....	220
Production.....	8, 220
World production.....	221
Magnesium.....	129
Magnesium sulphate.....	8, 221
Malagash mine.....	204
Manganese ore.....	130
Production.....	131
World production.....	131
Manganese bog.....	190, 222

INDEX—Continued

	PAGE		PAGE
Manitoba.....	25	Natural Gas-Con.	
Capital.....	25	Number of wells.....	164
Employment.....	26	Power employed.....	36
Fuel and electricity.....	34	Principal statistics.....	21
Number of plants.....	25	Production.....	8, 163, 164
Power employed.....	36	Wage-earners.....	27
Principal statistics.....	25	New Brunswick.....	25
Production.....	7, 14, 17	Capital.....	25
Review.....	66, 146	Employment.....	26
Wage-earners.....	26	Fuel and electricity.....	34
Manufactures based chiefly on minerals (list of publications).....	Inside back cover	Number of plants.....	25
Marble.....	261, 267	Power employed.....	36
Marl.....	261	Principal statistics.....	25
Mayo district.....	75	Production.....	7, 14, 16
McIntyre mine.....	47	Wage-earners.....	26
Mercury.....	132	New Caledonia.....	100
Consumption.....	132	Newfoundland.....	121
Imports.....	132	Nickel.....	99
World production.....	133	Alloys.....	101
Metal mining industry.....	20	Exports.....	100
Metal prices.....	13	Imports.....	100
Methods of computing values (Appendix 1).....	268	Method of computing value.....	268
Mica.....	199	Prices.....	13
Consumption.....	202	Production.....	7, 98, 99, 100
Capital.....	200	World production.....	100
Employment.....	27, 200	Nickel-copper industry, including tables of exports, imports, prices, production and world output of copper, metals of the platinum group, and nickel.....	98
Exports.....	201, 202	Capital.....	20
Fuel and electricity.....	30	Employment.....	20, 27, 99
Imports.....	201	Fuel and electricity.....	20, 30
Number of mines.....	22	Output from mines and smelters.....	98
Power employed.....	38	Power employed.....	36
Principal statistics.....	22	Proportion of nickel and copper in Sudbury matte.....	98
Production.....	8	Salaries and wages.....	20, 98
Wage-earners.....	27	Wage-earners.....	99
World production.....	203	Supplies and equipment purchased.....	42
Mineral industry.....	5	Nipissing Mining Co., Ltd.....	72
General review.....	5	Non-ferrous smelting and refining industry.....	143
List of publications.....	Inside front cover	Capacity of plants.....	149
Mineral waters.....	8, 222	Capital.....	148
Miscellaneous metal mining, including data on exports, imports, prices, production, also world production of antimony, aluminium, beryllium, bismuth, cadmium, chromite, iron and titanium ore, magnesium, manganese, mercury, molybdenum, pig iron, selenium, steel and rolled products, tantalum, tellurium, tin, tungsten, uranium minerals, vanadium.....	111	Employment.....	27
Capital.....	20	Fuel and electricity.....	36
Employment.....	27, 111	Power employed.....	30
Fuel and electricity.....	30	Principal statistics.....	20, 148
Number of plants.....	20	Production (including ores treated).....	148
Power employed.....	36	Wage-earners.....	148
Principal statistics.....	20	Non-metal mining industries in Canada (other than fuels) including data relating to operations in the following industries: abrasives, asbestos, feldspar and quartz, gypsum, iron oxides, mica, salt, talc and soapstone; and miscellaneous non-metals, including actinolite, barytes, bituminous sands, fluor spar, graphite, lithium minerals, magnesite, magnesium sulphate, manganese bog, mineral waters, natro-alunite, phosphate, pyrites, silica brick, sodium carbonate and sodium sulphate; also imports and exports of sulphuric acid.....	175
Values of shipments.....	20	Noranda mines and smelter.....	65, 144
Wage-earners.....	27, 112	Northwest Territories.....	19, 26, 62, 74
Miscellaneous Non-Metals, including actinolite, barytes, bituminous sands, fluorspar, graphite, lithium minerals, magnesite, magnesium sulphate, mineral waters, natro-alunite, phosphate, pyrites, sulphuric acid, silica brick, sodium carbonate, sodium sulphate.....	212	Notes on: Statistics of production.....	268
Capital.....	22, 212	Methods of computing values (Appendix 1).....	
Employment.....	27, 212	Nova Scotia.....	25
Fuel and electricity.....	27, 30	Capital.....	25
Number of firms.....	22	Employment.....	26
Power employed.....	38	Fuel and electricity.....	34
Production.....	213	Number of plants.....	25
Principal statistics.....	22	Power employed.....	36
Wage-earners.....	27, 213	Principal statistics.....	25
Molybdenite.....	133	Production.....	7, 14, 15
Production.....	134	Review.....	73
World production.....	134	Wage-earners.....	26
Monarch mine.....	74		
Mond Nickel Co.....	96		
Monel metal.....	96		
Monumental and ornamental stone.....	267		
Muscovite (see mica)			
N		O	
Natural abrasives.....	175	O'Brien mine.....	72
Natural gas.....	161	Ochre.....	8, 197
Capital.....	165	Ontario.....	145
Employment.....	27, 166	Employment.....	26
Fuel and electricity.....	30	Fuel and electricity.....	25
		Number of plants.....	25

INDEX—Continued

	PAGE		PAGE
Power employed.....	36	Québec-Con.	
Principal statistics.....	25	Principal statistics.....	25
Production.....	7, 14, 17	Production.....	7, 14, 16
Wage-earners.....	26	Review.....	65, 73
Ontario Refining Company.....	145	Wage-earners.....	26
Orthoclase (see feldspar)			
Osmium.....	109		
		R	
P		Radium.....	7, 134
Palladium.....	109	Refractories.....	9
Pamour mine.....	60	Rhodium.....	109
Peat Industry.....	8, 166	Rock wool.....	262, 265
Percentage of total value of mineral production, by provinces.....	15	Roofing tile.....	9
Petroleum industry.....	166	Rouyn district.....	66
Capital.....	171	Royal Canadian Mint.....	44, 55
Casing used.....	172	Rubble and riprap.....	262
Employment.....	27, 172	Ruthenium.....	109
Exports.....	170	Rutile (see Titanium)	
Fuel and electricity.....	30		
Imports.....	170		
Number of wells.....	169		
Power employed.....	36		
Principal statistics.....	21		
Production.....	8, 68, 169		
Wage-earners.....	27		
World production.....	171		
Petroleum refining industry.....	172		
Materials used.....	173		
Products.....	173		
Phlogopite (see mica)			
Phosphate.....	223		
Imports.....	223		
Production.....	8, 223, 224		
Pig iron, ferro-alloys, steel and rolled products.....	123		
Capital.....	124		
Employment.....	124		
Imports and exports.....	126		
Materials charged.....	125, 127		
Number of plants.....	124		
Principal statistics.....	124		
Production.....	125		
World production.....	128		
Pioneer mine.....	62		
Pitchblende.....	134		
Platinum group metals.....	107		
Exports.....	109		
Imports.....	109		
Method of computing value.....	268		
Platinum metals consumed in U.S.....	110		
Prices.....	13		
Production.....	7, 108, 109		
World production.....	110		
Porcelain insulators.....	247		
Porcupine area.....	60		
Potash.....	224		
Pottery.....	244		
Production from domestic clays.....	9		
Poultry grit.....	262		
Power employed (Also see under individual in- dustries).....	36		
Precious metals, including platinum			
Method of computing values.....	268		
Premier mine.....	61		
Prices (Also see under individual metals).....	13, 56		
Principal statistics, by industries.....	20		
Publications, list of			
Mineral industry.....	Inside front cover		
Manufactures based chiefly on minerals.....	Inside back cover		
Pulpstones.....	180		
Pumicite.....	177		
Pyrites.....	227		
Exports.....	228		
Imports.....	228		
Production.....	227		
		S	
Q		Salaries and wages (also under individual in- dustries).....	26
Quartz (also see under Feldspar and Quartz).....	8, 191	Salt.....	203
Quebec.....	25, 144	Capital.....	205
Capital.....	25	Consumption.....	207
Employment.....	26	Employment.....	27, 205
Fuel and electricity.....	34	Exports.....	207
Number of plants.....	25	Fuel and electricity.....	30
Power employed.....	36	Imports.....	297
		Power employed.....	38
		Principal statistics.....	22
		Production.....	8, 206
		Wage-earners.....	27, 206
		World production.....	208, 209
		Salt cake.....	232
		San Antonio mine.....	60
		Sand-lime brick.....	257
		Sand and gravel.....	252
		Capital.....	253
		Employment.....	27, 254
		Fuel and electricity.....	30
		Imports.....	255
		Power employed.....	38
		Principal statistics.....	24
		Production.....	9, 254-256
		Wage-earners.....	27, 254
		Sandstone.....	261
		Production.....	261
		Saskatchewan.....	25
		Capital.....	25
		Employment.....	26
		Fuel and electricity.....	34
		Number of plants.....	25
		Power employed.....	36
		Principal statistics.....	25
		Production.....	7, 14, 18
		Review.....	66, 146
		Wage-earners.....	26
		Scheelite.....	140
		Scythstones.....	178
		Selenium.....	135
		Sewer pipe.....	244
		Production.....	9
		Shawinigan Falls.....	112
		Sharpening stones.....	180
		Sheritt-Gordon mines.....	66
		Silex.....	191
		Silica.....	191
		Silica brick.....	230
		Production.....	8
		Silica sand.....	192
		Silver.....	80
		Consumption.....	81, 84, 86
		Content of coins.....	87
		Exports.....	85
		Imports.....	85
		Legislation.....	80, 81
		Method of computing value.....	268
		Monetary stocks.....	87
		Prices.....	13, 85
		Production.....	7, 82, 83
		Sources.....	83
		World production.....	85, 86

INDEX—Concluded

	PAGE		PAGE
Silver-cobalt mining.....	72	Tellurium.....	7, 136
Capital.....	72	Tetreault mine.....	73
Employment.....	27, 73	Thetford district.....	210
Fuel and electricity.....	30	Tile, drain.....	244
Number of plants.....	72	Production.....	9, 244
Power employed.....	36	Tile, structural.....	241
Principal statistics.....	20, 72	Tin.....	137
Shipments of ores, etc.....	72	Consumption.....	137
Supplies purchased.....	42	Imports.....	138
Wage-earners.....	27, 73	Prices.....	13
Silver-lead-zinc mining.....	73	World production.....	138
Capital.....	77	Titanium ore.....	7, 139
Employment.....	27, 77	Titanium white.....	139
Fuel and electricity.....	30	Trail smelter.....	91
Number of plants.....	20	Trap Rock (see granite)	
Ores mined and milled.....	76	Tripoli.....	177
Power employed.....	36	Treadwell Yukon Co., Ltd.....	75
Principal statistics.....	77	Tripolite (see volcanic ash)	
Products shipped.....	76	Tungsten.....	140
Shipments.....	75	World production.....	141
Supplies purchased.....	42	Turner Valley.....	162
Wage-earners.....	27, 77		
Silver mining, including exports, imports, prices, production, and world output of arsenic, cobalt, lead, silver and zinc.....	70	U	
Siscoe mine.....	47	Union Minière du Haut Katanga.....	70, 79
Slate.....	266	Uranium.....	134
Soapstone.....	8		
Soda ash.....	231	V	
Sodium.....	136	Vanadium.....	141
Sodium carbonate.....	230	Viking Field.....	163
Production.....	231	Vipond.....	47
Sodium sulphate.....	231	Volcanic dust.....	8, 177
Imports.....	232		
Production.....	8, 232	W	
Steel and rolled products (see pig iron, steel and rolled products).....	128	Wabana mine shipments.....	121
Stocks—Price of.....	56	Wage-earners.....	26-30
Stone, including data on granite, limestone, marble and sandstone.....	258	Wainwright field.....	166
Capital.....	259	Waite-Amulet mine.....	66
Employment.....	27, 260	Western Canada Flour Mills.....	204
Exports.....	266	Wolfram.....	141
Fuel and electricity.....	30	Whiting.....	265
Imports.....	266	World production of minerals (see individual minerals).....	
Monumental.....	267	Wright-Hargreaves.....	48
Power employed.....	38		
Principal statistics.....	24	Y	
Production.....	9, 261	Yellowknife area.....	62
Wage-earners.....	27, 260	Ymir camp.....	62
Stoneware and pottery.....	244	Yukon.....	26, 57, 62
Principal statistics.....	9, 23	Capital.....	26
Structural materials.....	23	Employment.....	26
Structural tile.....	243	Fuel and electricity.....	34
Sudbury area.....	97	Number of plants.....	26
Sullivan mine.....	74	Power employed.....	36
Sulphur.....	8, 227, 228	Principal statistics.....	26
Sulphuric acid.....	229	Production.....	7, 14, 18
Supplies—Consumption of.....	40	Review.....	57, 75
Sylvanite mine.....	47	Wage-earners.....	26
		Yukon Consolidated Gold Corp. Ltd.....	58
T			
Talc and soapstone.....	210	Z	
Capital.....	210	Zinc.....	91
Consumption.....	211	Consumption.....	92
Employment.....	27, 210	Exports.....	93
Exports.....	211	Imports.....	93
Fuel and electricity.....	30	Method of computing value.....	268
Imports.....	211	Prices.....	13, 93
Number of mines.....	22	Production.....	7, 92
Power employed.....	38	Refined zinc produced in Canada.....	92
Principal statistics.....	22	World production.....	94
Production.....	8, 211	Zirconium.....	142
Wage-earners.....	27		
World production.....	212		
Tantalum.....	136		
Taxation.....	44		

LIST OF PUBLICATIONS

PREPARED IN THE MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

STATISTICS OF MANUFACTURES—*based chiefly on Minerals.*

General reports on the sections of manufactures covered by the Mining, Metallurgical and Chemical Branch are issued as follows:—

Annual Printed Reports—

Iron and Steel and Their Products: Primary Iron and Steel (Pig-Iron, Ferro-Alloys, Steel and Rolled Products)—Castings and Forgings—Boilers, Tanks and Engines—Farm Implements—Machinery—Automobiles—Auto Parts—Bicycles—Railway Rolling Stock—Wire and Wire Goods—Sheet Metal Products—Hardware, Cutlery, and Tools—Bridge Building and Structural Steel—Miscellaneous Iron and Steel Products.

Manufactures of Non-Ferrous Metals: Aluminium Products—Brass and Copper Products—White Metal Alloys—Jewellery and Silverware—Electrical Apparatus and Supplies—Miscellaneous Non-Ferrous Metal Products—Non-Ferrous Smelting and Refining.

Manufactures of Non-Metallic Minerals: Aerated Waters—Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Dressed Stone—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Non-Metallic Mineral Products, n.e.s.

Chemicals and Allied Products: Coal Tar Distillation—Acids, Alkalies and Salts—Compressed Gases—Explosives, Ammunition and Fireworks—Fertilizers—Medicinal and Pharmaceutical Preparations—Paints, Pigments and Varnishes—Soaps, Washing Compounds and Cleaning Preparations—Toilet Preparations—Inks—Adhesives—Polishes and Dressings—Hardwood Distillation—Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.

Annual Bulletins—In addition to the foregoing printed reports, a series of bulletins is issued annually, each of which presents the principal statistics relative to production: (a) in a particular industry, e.g. Automobiles—Petroleum Products, etc., (b) in each of the four main groups of industries. These are published in mimeograph form from time to time during the year as the necessary material becomes available. Commodity bulletins are also issued on stoves, washing machines, wire nails, wire fencing, sulphuric acid, ammonium sulphate, etc.

Quarterly—

Production and Sales of Radio Receiving Sets.
Production and Imports of Galvanized Sheets.
Factory Sales of Electric Storage Batteries.

Monthly—

Production of Pig-Iron and Steel in Canada.
Coal and Coke Statistics for Canada.
Automobile Statistics for Canada.

SPECIAL REPORTS—

Directory of Chemical Industries as of July 1, 1932.
Consumption of Chemicals in Municipal Waterworks, 1934 and 1935.
The Fertilizer Trade of Canada, (Annual).

SEE INSIDE FRONT COVER FOR PUBLICATIONS ON THE MINERAL INDUSTRY

SEP 13 1983

